UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C., 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

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DP Barcode: D389536, 390653, 394268, 394270
Date: November 29, 2011

MEMORANDUM

SUBJECT: Ecological Risk Assessment for the Proposed Section 3 New Use of Acetamiprid on a Variety of Agricultural Crops and as Bait near Animal Areas and Enclosed Dumpsters

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The Environmental Fate and Effects Division (EFED) has completed the ecological risk assessment for the proposed Section 3 registration of acetamiprid (PC Code 099050; (*E*)-*N*1-[(6-chloro-3-pyridyl)methyl]-*N*2-cyano-*N*1-methylacetamidine) for use on the following crops: cotton, leafy vegetables within crop group 4, head and stem cole crops, leafy cole crops (within crop subgroup 5B), turnip greens, fruiting vegetables (within crop group 8-10), tuberous and corm vegetables within crop subgroup 1C, cucurbits with crop group 9, edible podded legumes within crop subgroup 6A, succulent shelled peas and beans within crop subgroup 6B, blueberries and other bush berries within subgroup 13-07B, caneberries with crop subgroup 13-07A, onions and other bulb vegetables within crop group 3-07, asparagus, pome fruit, and sweet corn. Uses are also proposed on tobacco but the previous label already had approved uses on that crop; however, the interval between applications was not previously assessed. Proposed uses also include use as bait near animal areas including Concentrated Animal Feeding Operations (CAFO), kennels, and around enclosed dumpsters to control flies, eye gnats, and flesh flies. Five labels were submitted for review by Nippon Soda Co., Ltd:

- Acetamiprid Technical (EPA Registration Number 8033-20),
- Justice® Insecticide (EPA Registration Number 8033-XXX),
- ASSAIL® 70WP (EPA registration Number 8033-23),
- ASSAIL® 30SG (EPA Registration Number 8033-36),
- RF2157 Insecticide (EPA Registration Number 8033-XXX).

Conclusions regarding the environmental fate and ecological risks associated with the proposed uses can be found in the attached document. This cover memo briefly summarizes the risk conclusions, reviews the status of data requirements, and provides recommendations for possible revisions to the proposed label.

Summary of Risk Conclusions

This screening-level risk assessment concludes that all proposed crop uses of acetamiprid have the potential for direct acute effects to Federally-listed threatened/endangered (listed) aquatic invertebrate species. There is also the potential for direct acute effects to non-listed aquatic invertebrates for five of the seven proposed crop uses (leafy cole crops, fruiting vegetables, citrus, sweet corn, and pome fruit). The Agency's chronic risk level of concern (LOC) for aquatic invertebrates is also exceeded for all proposed crop uses of acetamiprid. For the proposed bait uses, direct acute effects to listed and non-listed species as well as chronic effects are possible for all proposed uses, but the level of exceedence (*i.e.*, listed, non-listed) depends upon the application rate and whether bait is scattered or placed in a bait station. In this assessment, effects to aquatic species were also reassessed for all existing uses of acetamiprid because a transformation product of acetamiprid, IM-1-4, as well as unextracted residues, are now included in aquatic modeling, which was not the case in previous risk assessments.

For terrestrial organisms, there is the potential for direct acute effects to both listed and non-listed birds for all proposed crop and bait uses of acetamiprid. Based on a recently submitted study in zebra finches, acetamiprid has been shown to be very highly toxic to passerine birds on an acute exposure basis. Acetamiprid also has the potential to cause direct acute effects to listed mammals and terrestrial plants for all proposed uses except for soybeans. In addition, there is also potential for direct effects to non-listed terrestrial plants for uses on citrus and pome fruit.

Although specific risks to terrestrial invertebrates (*e.g.*, insect pollinators) have not been quantified in this assessment, neonicotinoid pesticides have been associated with insect pollinator declines by some in the public. The available data suggest that acetamiprid, a cyano-substituted neonicotinoid, is readily metabolized by honeybees and is less toxic than the nitroguanidine-substituted neonicotinoids. As an insecticide, acetamiprid is expected to affect terrestrial invertebrates, especially if it is used in conjunction with a P450 metabolism inhibitor such as piperonyl butoxide (Stewart, 1998). However, the dataset on acetamiprid is not sufficiently robust to make firm conclusions about risk to pollinators.

Direct risk to fish and aquatic plants is not predicted for any proposed uses; however, indirect effects to all taxa except aquatic non-vascular plants may occur due to effects on prey or habitat.[1]

Recommended Environmental Hazard Statements

Standard environmental hazard statements recommended by Chapter 8 of the Label Review Manual (USEPA, 2008a) were used to make the following recommendations for specific labels:

- Ground Water Advisory Statement to the RF2157 Insecticide Label because 1) some acetamiprid K_d values are less than 5 L/kg-soil, 2) acetamiprid hydrolysis half-lives are greater than 30 days for at least one pH, and 3) some acetamiprid and unextracted residue aerobic soil metabolism half-lives are greater than two weeks.

  Acetamiprid has properties and characteristics associated with chemicals detected in ground water. This chemical may leach into ground water if used in areas where soils are permeable, particularly where the water table is shallow.

- Surface Water Advisory for RF2157 Insecticide Label[2]

  This product may impact surface water quality due to runoff of rain water. This is especially true for poorly draining soils and soils with shallow ground water.

  This product is classified as having a high potential for reaching surface water via runoff for several months or more after application. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of acetamiprid from runoff water and sediment. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Avoid accidental or intentional application of this product to ditches, swales, drainage ways or impervious surfaces such as driveways. Runoff of this product to surface water will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

- Surface Water Advisory Should be Updated on the ASSAIL® 70WP and ASSAIL® 30SG Labels[3]

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[1] Indirect effects to terrestrial and aquatic vascular plants may occur due to effects on birds and mammals that are pollinators or important in seed dispersal of the species.
[2] The label language is recommended based on the assumption that this label is both a household/residential label and an agricultural label.
[3] The label language is recommended for agricultural labels.

This product may impact surface water quality due to runoff of rain water. This is especially true for poorly draining soils and soils with shallow ground water.

This product is classified as having a high potential for reaching surface water via runoff for several months or more after application. Avoid accidental or intentional application of this product to ditches, swales, drainage ways or impervious surfaces such as driveways. Runoff of this product to surface water will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

- The current label language in regards to hazard statements for non-target organisms should be replaced with the recommended label language in Table 1.

Table 1. Recommended Non-Target Organism Statements

Product	Current Label Language	*Recommended Label Language*
ACETAMIPRID Technical	This product is toxic to bees, birds, fish, and aquatic invertebrates.	*This product is toxic to birds and aquatic invertebrates. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.*
RF2157 Insecticide (Bait)	This product is highly toxic to aquatic invertebrates and toxic to birds. Treated baits on the soil surface may be hazardous to birds. This product is highly toxic to bees exposed to direct treatment. Do not apply this product if bees are actively foraging in the treatment area.	*This product is toxic to birds and aquatic invertebrates. Treated baits on the soil surface may be hazardous to birds. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.*
ASSAIL® 70WP **ASSAIL® 30SG**	This product is toxic to birds and wildlife. The product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treated area.	*This product is toxic to birds and aquatic invertebrates. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.*
JUSTICE Insecticide	This product is extremely toxic to fish and aquatic invertebrates. This product is toxic to wildlife. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the target area.	*This product is extremely toxic to fish. This product is toxic to birds and aquatic invertebrates. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.*[4]

Recommended Label Clarifications

The following section discusses information on labels that would help clarify how the proposed products will be used. EFED made assumptions in the risk assessment to account for the following missing information on the label:

[4] This statement on toxicity to fish is triggered due to the presence of bifenthrin in the product.

- Justice Insecticide

  Registration of a new liquid formulation (Justice Insecticide, EPA Registration Number 8033-XXX[5]) containing 13% acetamiprid and 10% bifenthrin is being sought for controlling chewing, sucking, and piercing insects on soybeans. The formulation (*e.g.*, suspension concentrate) should be specified on the label. The proposed label for the Justice Insecticide states that 0.014 to 0.07 lbs active ingredient per acre (ai/A) or 1.0 to 5.0 ounces of product per acre (oz/A) may be applied during a single application; however, the label does not specify whether these rates apply to acetamiprid or bifenthrin. Additionally, the maximum amount of product that may be applied per season should be included on the label. Finally, the label should clarify the maximum application rates for both acetamiprid and bifenthrin.

- RF2157 Insecticide

  Registration of a bait formulation containing 0.5% acetamiprid and 0.075% Z-9 tricosene (CAS#27519-02-04) is being sought to control house flies, eye gnats, and flesh flies. The proposed label states that bait may be placed in any commercial bait station or applied as scatter bait around the outside of areas where animals are kept, around confined animal feeding operations, dairies, poultry houses, broiler houses, turkey houses, chicken and pigeon coops, feed lots, swine buildings, kennels, near enclosed dumpsters, or on walkways inside caged layer houses. The formulation (*e.g.*, granules) should be specified on the label. The proposed label also indicates that scatter bait may be reapplied as needed. The label should specify a maximum number of applications per year and a minimum retreatment interval if more than one application per year is allowed.

- ASSAIL® 70WP and ASSAIL® 30SG Insecticide

  ASSAIL® 70WP and ASSAIL® 30SG Insecticides make the following statement with the name of the pesticide changing for each label:

  "ASSAIL 70WP has ovicidal, larvicidal, and adulticidal activity against many pests which can be effectively utilized in IPM programs. ASSAIL 70WP Insecticide has been shown to leave substantial populations of many beneficial insects and spiders after use. The lower rates allow for maximum beneficial survival and faster rebound of beneficial populations. Control of important pests coupled with retention of beneficial insects and spiders can offer significant benefits to those producers utilizing integrated pest management programs."

  EFED does not have data to support these claims and recommends that these statements be removed from the label.

[5] The proposed registrations will not get a full registration number until the product is registered. The XXX reflects the numbers that will be completed with registration.

Data Gaps and Uncertainties

Aerobic Aquatic and Anaerobic Aquatic Metabolism Data

Data on aerobic aquatic and anaerobic aquatic metabolism (OCSPP Guidelines 835.4300 and 835.4400) in two sediments each are recommended; however, data are only available for each type of test in one sediment. This could result in underestimation or overestimation of typical half-lives in such media. Because only a single data point (half-life) was available for each of these studies, model inputs were estimated to be three times the measured value, in keeping with standard EFED procedure (USEPA, 2009b). Having these additional data available would allow estimation of a 90th percentile confidence bound on the mean, which would likely result in a lower input value. A total toxic residue (including parent, IM-1-4, and unextracted residues) approach was used in modeling for the ecological risk assessment and the half-life values used in modeling were high (*i.e.*, >1500 days) and the estimated EECs were conservative. These data gaps will also influence the estimated drinking water concentrations. The drinking water level of concern was not approached even with the conservative values. EFED does not recommend requesting these data at this time; however, these studies may be needed in the future.

Identification of Unextracted Residues in Fate Studies

The identity of unextracted residues is unknown in a number of submitted studies where unextracted residues made up much greater than 10% of applied radioactivity (<1 to 40%). This creates significant uncertainty in the risk assessment. Due to the uncertainty in the identity of these residues, it was assumed that the unidentified residues were residues of concern in estimating the half-lives of total residues of concern. This risk assessment conservatively assumes that the unextracted residues had a similar toxicity to the parent compound. For ecological risk assessment, the parent, IM-1-4, and unextracted residue risk quotients are up to twice the value for the parent and IM-1-4 only. For the drinking water assessment, inclusion of unextracted residues resulted in EDWCs that are four to 35 times the EDWCs based on parent alone. If the identity of the unextracted residues were known, the degradate profile would likely change. EFED does not recommend that data to resolve this issue be requested at this time; however, such studies may be needed in the future.

Ecological Effects Data Gaps

Ecological effects data gaps are divided into two general categories:

(1) Data gaps related to deficiencies in previously submitted studies. These data gaps are considered important for evaluating proposed uses of acetamiprid and consist of the following studies/issues:

- An avian chronic reproductive toxicity study (MRID 46369201) yielded a non-definitive endpoint. A NOAEC value was not derived in the study and effects were recorded at all concentrations tested. Establishment of a NOAEC is essential if the study is to be used in risk assessment. Therefore the extent of possible chronic risk to birds is not able to be determined until an additional reproductive study (OPPTS 850.2300) is submitted.

- The seedling emergence study in terrestrial plants (OPPTS 850.4100; MRID 44988413) did not measure plant weight, which is one of the two major endpoints in this type of study, resulting in uncertainty regarding the effects of acetamiprid on plant growth.

- Based on current Agency policy, an acceptable honeybee foliage residue study (OPPTS 850.3030) is recommended when the acute contact toxicity to bees is <11 µg/bee, as in the case of acetamiprid. A foliage residue toxicity study (MRID 44651875) was submitted for acetamiprid but was deemed unacceptable. An acceptable study would decrease uncertainty around effects to honeybees from foliar exposure.

(2) Data gaps that, if addressed, would help decrease uncertainty in the overall risk picture for acetamiprid and its degradates. The following studies/information may be recommended during the upcoming registration review process for acetamiprid which begins in the 4th quarter of 2012:

- Avian acute dietary studies (MRIDs 44651860, 44651861) were submitted and yielded non-definitive endpoints (*i.e.*, LC_{50} values >5,000 mg ai/kg-diet). Treatment-related mortalities were observed in both studies. Current EFED guidance states that additional study data (OPPTS 850.2200) should be recommended in cases where a definitive endpoint is not established and treatment-related mortalities occur in a study. Since this guidance was only recently made available (May 2011), it may be recommended during acetamiprid registration review.

- EFED may recommend several non-guideline studies in cases where toxicity to bees or other beneficial insects may exist. This is particularly relevant to neonicotinoid insecticides such as acetamiprid. Since acetamiprid is systemic, it may be translocated to pollen and nectar, leading to exposure of foraging bees. Non-guideline pollen and nectar residue data may be recommended during registration review to address uncertainties in this exposure pathway. Also, since one of the uses of acetamiprid is as an ovicide, potential effects to young bees could exist. Toxicity studies with acetamiprid have only been submitted for adult bees and do not address possible affects on brood survival. Therefore, a larval toxicity study may also be requested during registration review of acetamiprid.

Uncertainties Associated with Fly Bait Label

The proposed label for the scatter bait use of acetamiprid states that bait should be reapplied as needed, which does not provide sufficient detail to allow running specific exposure scenarios for determining maximum potential risk. There is insufficient information to determine whether the bait formulation containing acetamiprid would attract or be palatable to non-target terrestrial organisms such as birds, mammals and beneficial insects. Also, the bait use label states that any standard fly bait station may be used to house bait pellets. It is not known whether some or all fly bait stations would allow birds access to the bait or potentially improve access due to increased visibility resulting from elevation of the bait station from the ground. If the use of acetamiprid was limited to bait stations that prevented access to birds and mammals, this would significantly reduce risk since exposure is not as likely to occur. The uncertainties surrounding bait uses are of particular concern for birds because a recently submitted study showed that acetamiprid is very highly toxic to passerine birds; therefore, direct consumption of even small amounts of bait (e.g. amount spread over one square foot) triggers risks of concern.

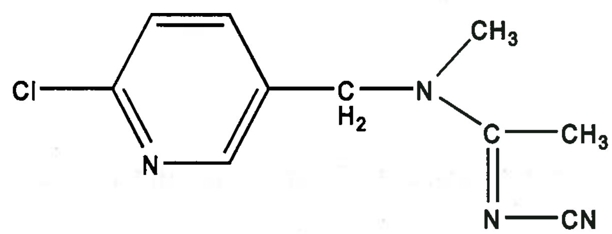
United States Environmental Protection Agency

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

ECOLOGICAL RISK ASSESSMENT

For The Proposed National (Section 3) Registration of

Acetamiprid
For Use on Various Agricultural Crops and as a Bait Near Animal Areas and Enclosed Dumpsters to Control Flies, Eye Gnats, and Flesh Flies



N^1-[(6-chloro-3-pyridyl)methyl]-N^2-cyano-N^1-methylacetamidine
USEPA PC Code: 099050
CAS Number: 135410-20-7

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1. Executive Summary

The Environmental Fate and Effects Division (EFED) has completed a review of the Section 3 new use request (DP Barcode D389536, 390653, 394268, 394270) for the insecticide acetamiprid (PC Code 099050). Acetamiprid is an insecticide belonging to the cyano-substituted subclass of the neonicotinoid pesticides. The compound acts as a nicotinic acetylcholine (nACh) receptor agonist by binding with receptor. In plants, acetamiprid is a systemic insecticide. Four formulated products are proposed:

- Justice Insecticide (13% acetamiprid and 10% bifenthrin) for use on soybeans,
- RF2157 (0.5% acetamiprid and 0.075% z-9 tricosene) for use as a bait (it attracts insects) outside of animal areas, around confined animal feeding operations, kennels, *etc,* and around enclosed dumpsters to control house flies, eye gnats, and flesh flies,
- ASSAIL® 70WP (70% acetamiprid), and
- ASSAIL® 30SG (30% acetamiprid).

This assessment evaluates the use of acetamiprid only. The maximum application rate proposed for soybeans is 0.04 lbs ai/A, with a maximum of two applications with a seven day minimum retreatment interval. The maximum seasonal application rate specified on the label is 0.78 lbs ai/A. The maximum application rate assessed for RF2157 is 0.0082 lbs ai/A. A maximum number of applications on the label and minimum retreatment interval were not specified on the label. Therefore, the assessment assessed a single application and 24 applications with a minimum three day retreatment interval. The proposed labels are both unclear with respect to the proposed use as specified in Section 2.1. The ASSAIL® 70WP and ASSAIL® 30SG labels have proposed uses on some already approved crops and on some additional crops. The crops include cotton, leafy vegetables within crop group 4, head and stem cole crops, leafy cole crops within crop subgroup 5B, turnip greens, fruiting vegetables with crop group 8-10, citrus with crop group 10-10, tuberous and corm vegetables with crop subgroup 1C, grapes and other climbing small fruits (except fuzzy kiwifruit) within crop subgroup 13-07F, stone fruit within crop group 12, cucurbits with crop group 9, tree nuts within crop group 14 including pistachio, edible podded legume with crop subgroup 6A, succulent shelled peas and beans within crop subgroup 6B, strawberries and other low growing berries with crop group 13-07G, blueberries and other bush berries within crop subgroup 13-07B, caneberries within crop subgroup 13-07-A, onions and other bulb vegetables, clover, and asparagus. The highest proposed use is for a maximum of 0.018 lbs active ingredient per acre (ai/A) five possible applications resulting in a seasonal maximum application rate of 0.5 lbs ai/A. The minimum retreatment interval is 5 days. The Justice and Assail® products are all applied as flowables and may be applied via air, ground, and airblast. The bait (assumed to be a dry material) is either scattered on surfaces or placed in a bait station.

1.1. Conclusions – Exposure Characterization

Acetamiprid may be transported to surface water and ground water via runoff, leaching, and spray drift. The primary route of degradation is aerobic soil metabolism. Acetamiprid has six identified degradates, five of which are major degradates (*e.g.*, present at greater than 10%

applied radioactivity in fate studies). One degradate, N-methyl(6-chloro-3-pyridyl)methylamine (IM-1-4), is considered a residue of concern and was assumed to have similar toxicity to the parent (USEPA, 2009, D364328). Unidentified unextracted residues made up a significant amount of radioactivity in the metabolism studies. Therefore, degradation rates were estimated for the parent alone and for total residues of parent, unextracted residues, and IM-1-4 a degradate identified as a residue of concern

1.2. Conclusions – Effects Characterization

Acetamiprid is very highly toxic to birds and aquatic invertebrates and moderately toxic to mammals and honeybees on an acute exposure basis. It is practically nontoxic to fish on an acute exposure basis. Chronic reproductive effects resulting from acetamiprid exposure have been reported in both terrestrial and aquatic animals.

1.3. Risk Conclusions

Table 1-1 summarizes the risk conclusions for the proposed uses. The results of this screening-level risk assessment are that all of the proposed and existing crop uses[6] of acetamiprid have the potential for direct acute effects to Federally-listed threatened/endangered (listed) aquatic invertebrate species. There is also the potential for direct acute effects to non-listed aquatic invertebrates for all evaluated crop uses except for use on clover (an existing use). The Agency's chronic risk level of concern (LOC) for aquatic invertebrates is exceeded for all evaluated crop uses of acetamiprid except for clover. Direct risk to non-listed and listed fish and aquatic plants is not expected for any of the evaluated uses. Direct effects to species may result in indirect effects to other species by changing availability of prey, habitat, and other factors important to survival and reproduction.[7] Due to effects on numerous taxa, indirect effects to all taxa (except aquatic non-vascular plants) are expected for all crop uses.

For bait applications, there is significant uncertainty regarding the level of impact on the aquatic system since the proposed label specifies that bait may be reapplied as needed, possibly resulting in multiple applications and high rates of exposure. Risk from the use of a scatter bait applied 24 times results in risks of concern for both listed and non-listed freshwater and estuarine/marine aquatic invertebrates; conversely, risks of concern are only predicted for listed freshwater invertebrates if scatter bait is applied once. No risk to aquatic organisms is expected if the bait is placed in a bait station since it was assumed that the bait would not be removed from the station and thus exposure would not occur in the aquatic environment. This conclusion would be stronger if label language indicated that the bait should be used in the bait stations in a manner to ensure that the bait could not fall out of the bait stations onto the ground. Direct risk to non-listed and listed fish and aquatic plants is not expected for any of the evaluated bait uses. Due to effects on numerous taxa, there are potential indirect effects to all taxa (except aquatic non-vascular plants) for the bait uses.

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[6] Existing uses were evaluated because new data were used in the aquatic modeling to estimate exposure to aquatic organisms. The uses evaluated were all on the proposed labels.
[7] Indirect effects to terrestrial and aquatic vascular plants may occur due to direct effects on birds and mammals that are important in seed dispersal or pollination of the plant.

For terrestrial organisms, there is the potential for direct acute effects to both listed and non-listed birds for all proposed crop and scatter bait uses of acetamiprid. The uncertainty regarding this risk is increased due to the relatively steep dose response curve of acetamiprid in passerine birds, suggesting that even minor increases in exposure may lead to higher levels of mortality. Direct chronic risk to birds is also predicted for all proposed crop and scatter bait uses. Acetamiprid has the potential to cause direct acute effects to listed mammals for all proposed uses except for soybeans. There is the potential for direct risk to terrestrial dicotyledonous (dicot) plants from all proposed crop uses except for soybeans. Direct risk to monocot plants is possible for citrus and pome fruit uses. There is some open literature data that suggests that that nitro-substituted neonicotinoids (*e.g.*, clothianidin, imidacloprid, thiamethoxam) are more toxic to bees than their cyano-substituted counterparts such as acetamiprid, because the latter are more readily metabolized. The registrant-submitted acute toxicity data also support this. If acetamiprid is formulated with piperonyl butoxide and the P450 detoxification system is inhibited, acetamiprid may be as toxic as the nitroguanidine-substituted neonicotinoids. As an insecticide, acetamiprid is expected to affect terrestrial invertebrates, especially when it is formulated with a cytochrome P450 inhibitor. However, the current set of literature and registrant-submitted studies is not sufficiently robust to make significant inferences about the risks of acetamiprid to individual bees or overall colony survival, growth, or reproduction. Due to effects on numerous taxa, indirect effects to all taxa (except aquatic non-vascular plants) are expected for the bait uses.

Table 1-1. Summary of the potential for direct and indirect effects to different taxa from proposed uses of acetamiprid. Unless otherwise indicated, direct risk may occur for both listed and non-listed species. Indirect effects are assessed for listed species only.

D = Direct effects; I = Indirect effects

Taxon	Leafy Cole Crops and Turnip Greens, and Sweet Corn	Asparagus	Fruiting Vegetables	Citrus	Pome Fruit	Soybeans	Scatter Bait[3]
Terrestrial and semi-aquatic plants (monocots)	I	I	I	D (listed only)/I	D (Listed only)/I	I	I
Terrestrial and semi-aquatic plants (dicots)	D (listed only)/I	D (listed only)/I	D only/ I	D / I	D / I	I	I
Birds, terrestrial phase amphibians, and reptiles[2]	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I
Mammals	D (acute, listed only)/I	D (acute, listed only)/I	D (acute, listed only)/I	D (acute, listed only)/I	D (acute, listed only)/I	I	D (acute and chronic)
Aquatic vascular plants	I	I	I	I	I	I	I
Aquatic non-vascular plants	None	None	None	None	None	None	None
Freshwater fish	I	I	I	I	I	I	I

Taxon	Leafy Cole Crops and Turnip Greens, and Sweet Corn	Asparagus	Fruiting Vegetables	Citrus	Pome Fruit	Soybeans	Scatter Bait[3]
and aquatic phase amphibians[2]							
Freshwater invertebrates	D (acute and chronic)/I	D (acute listed only and chronic)/ I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute listed only and chronic)/I	D (acute and chronic)/I
Marine/estuarine fish	I	I	I	I	I	I	I
Marine/estuarine invertebrates	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I

[1] Direct effects to species may result in indirect effects to other species by changing availability of prey, habitat, and other factors important to survival and reproduction. Indirect effects to terrestrial plants and aquatic nonvascular plants may occur due to effects on mammals and birds that are important in seed dispersal or pollination of the plant.
[2] Terrestrial and aquatic phase amphibian effects are based on surrogate information from birds and freshwater fish, respectively.
[3] Risk from bait applications depends on reapplication rate. The results are shown assuming 24 consecutive applications and a three day reapplication interval.

2. Problem Formulation

2.1. Proposed New Uses

This assessment evaluates the environmental fate and potential ecological risks associated with several proposed uses of acetamiprid (PC Code 099050; (*E*)-*N*1-[(6-chloro-3-pyridyl)methyl]-*N*2-cyano-*N*1-methylacetamidine) that have been submitted by Nippon Soda Co., Ltd. The labels evaluated include:

- Acetamiprid Technical (EPA Registration Number 8033-20, 99.5% acetamiprid),
- Justice Insecticide (EPA Registration Number 8033-XXX, 13% acetamiprid),
- ASSAIL® 70WP (EPA registration Number 8033-23, 70% acetamiprid),
- ASSAIL® 30SG (EPA Registration Number 8033-36, 30% acetamiprid), and
- RF2157 Insecticide (EPA Registration Number 8033-XXX, 0.5 % acetamiprid, 0.075% Z-9 tricosene).

The Justice label is for a proposed new use on soybeans and the Assail® 70WP and 30SG labels propose new uses on several agricultural crops. The RF2157 is a proposed new use as a bait to control insects.

2.1.A. Proposed Crop Uses

Both ASSAIL® 70WP and 30SG propose the same uses on the same agricultural crops. All uses on the labels were evaluated in this assessment regardless of whether they already had approved uses because new data are available and not all previous assessments considered exposure to total residues of acetamiprid, IM-1-4, and unextracted residues. A number of different uses are proposed on the labels including use on cotton, leafy vegetables within crop group 4, head and stem cole crops, leafy cole crops (within crop subgroup 5B), turnip greens, fruiting vegetables (within crop group 8-10), tuberous and corm vegetables within crop subgroup 1C, cucurbits with crop group 9, edible podded legume within crop subgroup 6A, succulent shelled peas and beans within crop subgroup 6B, blueberries and other bush berries within subgroup 13-07B, caneberries with crop subgroup 13-07A, onions and other bulb vegetables within crop group 3-07, asparagus, pome fruit, and sweet corn. Uses are also proposed on tobacco but the previous label already had approved uses on that crop; however, the interval between applications was not previously assessed. Uses on the proposed label that were previously assessed include citrus fruits, grapes and other climbing small fruits (except fuzzy kiwifruit) within crop subgroup 13-07F, and tree nuts within crop group 14 including pistachio. Uses involving aerial, chemigation, ground, and airblast applications are proposed. Each crop group or sub-group contains a number of associated crops. These are listed in Table B2. The specific crops in each subgroup are used to select the appropriate PRZM scenario to use in aquatic modeling. The soluble granule is dissolved into water or adjuvant/oil and applied as a spray. The ASSAIL® 30SG Insecticide label states that for applications to row crops or orchard and vine crops, "*For aerial application, select nozzles and pressure that deliver medium spray droplets as indicated in nozzle manufacturer's catalogs and in accordance with ASAE Standard S-572*". Additionally, use of adjuvant, such as high quality non-ionic or silicone surfactants or methylated seed oils is recommended to enhance coverage and plant uptake and may improve pest control on certain crops. Details on use rates proposed are shown in Table 2-1.

The proposed Justice Insecticide comprises a proposed Section 3 new use on soybeans via ground, aerial, and chemigation applications. The proposed label states that 0.014 to 0.07 lbs active ingredient per acre (ai/A) or 1.0 to 5.0 ounces of product per acre (oz/A) may be applied during a single application. Since the label does not specify whether these rates apply to acetamiprid or bifenthrin, it could be assumed that they apply to both actives in their respective percentages by weight. The maximum seasonal application rate for acetamiprid is listed as 0.078 lbs ai/A/ growing season on the label; however, the maximum single application rate and maximum number of applications suggest a maximum seasonal application rate of 0.08 lbs acetamiprid/A (0.04 lbs ai/A per application x two applications per year). While these values are essentially the same (*e.g.*, 0.078 rounds to 0.08), technically the 0.08 is higher than the maximum seasonal rate on the label. Ideally, the two rates would be the same. Additionally, the maximum amount of product that may be applied per season should be included on the label. Finally, the label should clarify the maximum application rates for both acetamiprid and bifenthrin. The calculated 0.08 lbs ai/A rate is assumed for terrestrial exposure assessment and for Tier I estimates of concentrations for surface water (Table 2-1). The 0.078 lbs acetamiprid/acre was used for Tier II estimates of concentrations in surface water. Whether the application rate is 0.078 lbs ai/A or 0.08 lbs ai/A has little influence on the risk conclusions.

Table 2-1. Proposed New Use of Acetamiprid on Crops

Use Site/ Source	Single App. Rate (lbs. ai/A)	Number of Apps.	Seasonal App. Rate (lbs. ai/A)	Interval Between Apps. (days)	Comments
Cotton	0.1	4	0.4	7	None
Leafy Vegetables within Crop Group 4	0.075	5	0.375	7	None
Head and Stem Cole Crops	0.075	5	0.375	7	None
Leafy Cole Crops (within Crop Subgroup 5B) and Turnip Greens	0.1	4	0.375 (0.4 assumed for modeling)	7	None
Fruiting Vegetables (within Crop Group 8-10)	0.075	4	0.3	7	None
Citrus (within Crop Group 10-10)[2]	0.25	5	0.55	7	None
	0.25 (assumed[4])	2 (assumed[4])		7	None
	0.11 (assumed[4])	5	0.55	7	None
Pome Fruit (within Crop Group 11-10)	0.15	4	0.60	12	None
Tuberous and Corm Vegetables (within Crop Sub-group 1C)[2]	0.075	4	0.3	7	None
Tobacco[2]	0.075	4	0.3	7	None
Grapes and Other Climbing Small Fruits (except Fuzzy Kiwifruit, within Crop Sub-group 13-07F)[2]	0.1	2	0.2	14	None
Stone Fruit (within crop Group 12)	0.15	4	0.6	10	None
Cucurbits (within Crop Group 9)	0.10	5	0.5	5	None
Tree Nuts (within Crop Group 14, including Pistachio)[2]	0.18	4	0.72	14	None
Edible Podded Legume (within Crop Subgroup-6A) and Succulent Shelled Peas and Beans (within Crop Sub-Group 6B)	0.1	3	0.3	7	None
Strawberries and Other Low Growing Berries (within Crop Sub-group 13-07G)	0.13	2	0.26	7	None
Blueberries and Other Bush Berries (within Crop Sub-Group 13-07B) and Cane Berries (within Crop Sub-group 13-07A)	0.085	5	0.5	7	None
Onions and Other Bulb Vegetables (within Crop Group 3-07)	0.15	4	0.6	7	None
Clover (for use in OD, OR, and WA only)	0.075	1	0.075	NA	None
Asparagus	0.1	2	0.2	10	None
Sweet Corn	0.1	2	0.21	14	None

Use Site/ Source	Single App. Rate (lbs. ai/A)	Number of Apps.	Seasonal App. Rate (lbs. ai/A)	Interval Between Apps. (days)	Comments
	0.054	4	0.21	7	
Soybean	0.04	2	0.078 (0.08 assumed[3])	7	150 foot buffer
					25 foot buffer

Abbreviations: App=Application

[1] The proposed registrations will not get a full registration number until the product is registered. The XXX reflects the numbers that will be completed with registration.

[2] Uses on citrus, potatoes, tobacco, tree nuts, grapes and other climbing small fruits were previously assessed(USEPA, 2011, D390070)(USEPA, 2011, D390070)(USEPA, 2011, D390070)(USEPA, 2011, D390070)(USEPA, 2011, D390070)(USEPA, 2011, D390070).

[3] Assumed for Tier I aquatic exposure modeling and terrestrial exposure modeling because it is not possible to model multiple applications at different rates.

[4] Scenarios were assumed for modeling purposes because the five applications of the single maximum application rate cannot be made according to the maximum seasonal application rate.

The Justice Insecticide label specifies that a 10-foot vegetative buffer strip should be maintained between the field edge and down gradient aquatic habitat (such as, but not limited to, lakes reservoirs, rivers, permanent streams, marshes or natural ponds, estuaries, and commercial fish ponds). A 25-foot buffer zone is recommended for applications with ground boom, overhead chemigation, or airblast equipment. A 150-foot buffer is recommended for applications by air. The label also directs the user to use medium spray droplets as indicated in nozzle manufacturer's catalogs and in accordance with ASAE Standard S-572 for aerial applications.

2.1.B. Proposed Bait Uses

Registration of a bait formulation (EPA Reg. No. 8033-XXX[1]) containing 0.5% acetamiprid and 0.075% Z-9 tricosene (CAS#27519-02-04) is being sought to control house flies, eye gnats, and flesh flies. The proposed label states that bait may be placed in any commercial bait station or applied as scatter bait around the outside of areas where animals are kept, around confined animal feeding operations, dairies, poultry houses, broiler houses, turkey houses, chicken and pigeon coops, feed lots, swine buildings, kennels, near enclosed dumpsters, or on walkways inside caged layer houses. The proposed application rate for bait stations is 1.5 oz. of bait per 250 sq ft and the proposed rate for scatter bait is 3 oz. per 500 sq ft (both application rates are equivalent to 0.082 lbs ai/A) (Table 2-2). The proposed label also states that scatter bait may be reapplied as needed. In the absence of a maximum number of applications, it was assumed that a maximum of 24 applications could occur and minimum retreatment interval of three days was assumed for estimating exposure. Lower numbers of applications were also characterized. Aquatic EECs were only estimated for the scatter bait use as it is assumed that all acetamiprid will remain in the bait station and will not be transported in significant quantities to water. It is assumed that terrestrial organisms may consume bait placed in a bait station; however, direct risk to terrestrial plants is assumed to be minimal when the bait is placed in a bait station as exposure is expected to be negligible.

Table 2-2. Requested new use of acetamiprid for fly bait.

Application Method(s)	Application Rate on Label	Application Rate (lb ai/acre)	Maximum No. of Applications/Year
Scatter Bait	3 oz per 500 sq. ft.	0.082	Reapply as needed
Bait Station	1.5 oz per 250 sq. ft.	0.082	Not specified

2.2. Previous Risk Assessments

The new chemical assessment was first completed in 2002 and the most recent risk assessment was completed in 2009 (USEPA, 2002, D270368, 2009, D364328). The risk conclusions from the most recent assessment are described here. A 2009 assessment for new uses on red clover (maximum single application of 0.075 lbs ai/A with a maximum of one applications) and the climbing vine small fruit subgroup (crop subgroup 13-07F, except fuzzy kiwifruit; maximum single application rate of 0.1 lbs ai/A, maximum number of applications per season of two) indicated that the proposed uses could result in direct effects to birds, reptiles, and terrestrial-phase amphibians on both an acute and chronic exposure basis. Listed freshwater aquatic invertebrates and animals may be affected by acute exposures. Finally, listed dicot plants may be adversely affected by spray drift from aerial applications to grapes and climbing vine small fruits. Indirect effects were predicted for aquatic plants, fish, amphibians, estuarine/marine fish and aquatic invertebrates. The assessment considered the parent and the degradate, IM-1-4, as residues of concern and risk was evaluated using the total toxic residue approach. Unextracted residues were not included in calculations of half-lives used in modeling. New avian data for passerines have become available since this assessment was completed.

More information on the previous ecological risk assessments, their associated uses, and the corresponding citation is available in Appendix H. This information was used in this assessment to understand what new information is available since previously completed assessments, whether the previous uses were evaluated with the most up to date information and procedures, and finally how the proposed use patterns relate to previously evaluated use patterns. This information is also useful to future assessors in making the same determinations so the information does not have to be summarized again to answer these questions.

2.3. Mode of Action

Acetamiprid is a chloronicotinyl insecticide belonging to the cyano-substituted sub-class of the neonicotinoid pesticides, which also includes thiacloprid. Similar to other neonicotinoids which include the nitroguanidine-substituted compounds such as imidacloprid, clothianidin, dinotefuran and thiamethoxam, acetamiprid is a systemic, broad spectrum insecticide that acts as a stomach poison against sucking and some biting insects (Sur and Stork, 2003). The compound acts as an agonist of the nicotinic acetylcholine receptor (nAChR) on the postsynaptic membrane of nerve cells. The active ingredient interrupts the function of the insect nervous system. As reported in the original Section 3 risk assessment, biochemical radio-ligand binding studies show that acetamiprid interacts with high affinity at the nAChR binding site in insects, and with low affinity at the nAChR in vertebrates (USEPA, 2002, D270368). The cyano-substituted neonicotinoids exhibit a lower toxicity (LD_{50} values of 7.1 to 14.6 µg/bee) than the nitro-substituted neonicotinoids (18 to 138 ng/bee) (Iwasa *et al.*, 2004). Inhibitors of P450 enzymes resulted in increased toxicity of acetamiprid, indicating that P450 metabolism is an important detoxifying pathway for insects (Iwasa *et al.*, 2004).

2.4. Conceptual Model

2.4.A. Risk Hypothesis

A risk hypothesis describes the predicted relationship among the stressor, exposure, and assessment endpoint response along with the rationale for their selection (USEPA, 2004). For this assessment, the risk is stressor-initiated, where the stressor is acetamiprid and a major degradate IM-1-4. IM-1-4 was identified in the previous risk assessment as having a similar toxicity to the parent (USEPA, 2009, D364328). The risk hypothesis for this risk assessment is provided below:

> *Given the uses of acetamiprid and its environmental fate properties, there is a likelihood of exposure to non-target terrestrial and/or aquatic organisms. When used in accordance with the label, acetamiprid results in potential adverse effects upon the survival, growth, and reproduction of non-target terrestrial and aquatic organisms. Based on previous risk assessments there are potential direct risks to birds, aquatic invertebrates, and dicotyledonous plants.*

2.4.B. Conceptual Diagrams

In order for a chemical to pose an ecological risk, it must reach non-target organisms at concentrations that cause adverse effects. An exposure pathway is a route(s) through which a pesticide moves in the environment from the application site to non-target organisms. The assessment of ecological exposure pathways in this assessment includes an examination of source and potential migration pathways from the proposed new uses of acetamiprid, and the determination of potential exposure routes to non-target species.

The conceptual model depicts the potential pathways for ecological risk associated with acetamiprid use on agricultural crops or bait applications. The conceptual model provides an overview of the expected exposure routes for terrestrial and aquatic organisms.

The potential exposure pathways and effects of acetamiprid on aquatic environments from uses on agricultural crops are depicted in Figure 2-1 and for terrestrial environments in Figure 2-2. Figure 2-4 depicts exposure from drinking water and inhalation to terrestrial vertebrates and invertebrates from uses on agricultural crops and when used as a scatter bait. Figure 2-3 depicts exposure pathways and potential effects from use of acetamiprid as bait. Stressors of concern include parent and IM-1-4. Solid arrows depict the most likely routes of exposure and effects; dashed lines depict potential routes of exposure that are not considered likely for acetamiprid. Acetamiprid will enter the environment via direct application to terrestrial environments. It may move off site via spray drift, runoff, and leaching. Acetamiprid is considered non-volatile from dry non-adsorbing surfaces, water, and soil. Additionally, the Screening Tool for Inhalation Risk (STIR) version 1.0 (November 23, 2010) indicates that exposure via inhalation is not likely to be a risk concern for birds and mammals (Appendix E). These results combined with the estimated atmospheric half-life of less than two days indicate that long range transport in the vapor phase is not an exposure pathway of concern. Additionally, the K_{OA}, K_{OW}, and BCF suggest that acetamiprid is not likely to bioconcentrate or bioaccumulate in aquatic or terrestrial organisms. Organic-carbon normalized sorption coefficient (K_{OC}) values range from 157 to 300 L/kg-$_{OC}$ indicating that acetamiprid is mobile enough to potentially leach into groundwater. The Screening Imbibition Program (SIP) version 1.0, August 19, 2010 identifies that acetamiprid has the potential to be present in drinking water at high enough concentrations to result in a risk concern (Appendix E). This is a highly conservative evaluation as SIP assumes that concentrations in drinking water could be at the level of solubility. Acetamiprid may be applied by spreading of a dry material or as a flowable; spray drift is only expected to result in significant exposure with broadcast applications (both aerial and ground spray) of liquids. When acetamiprid is placed into a bait station, runoff into the aquatic environment will likely be negligible; however, consumption by non-target insects and terrestrial vertebrates may still occur.

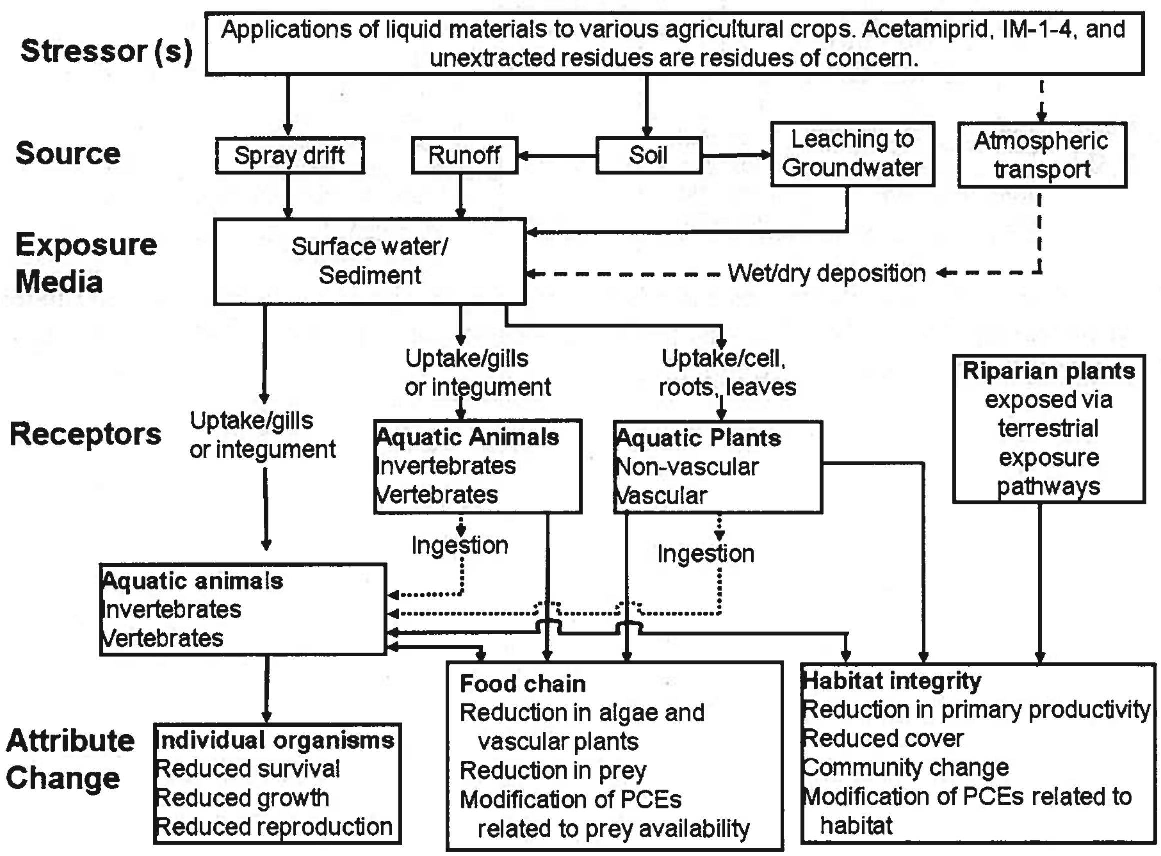


Figure 2-1. Conceptual model for potential effects of acetamiprid on aquatic organisms when used on various agricultural crops. (Dotted lines indicate exposure pathways that have a low likelihood of contributing to ecological risk)

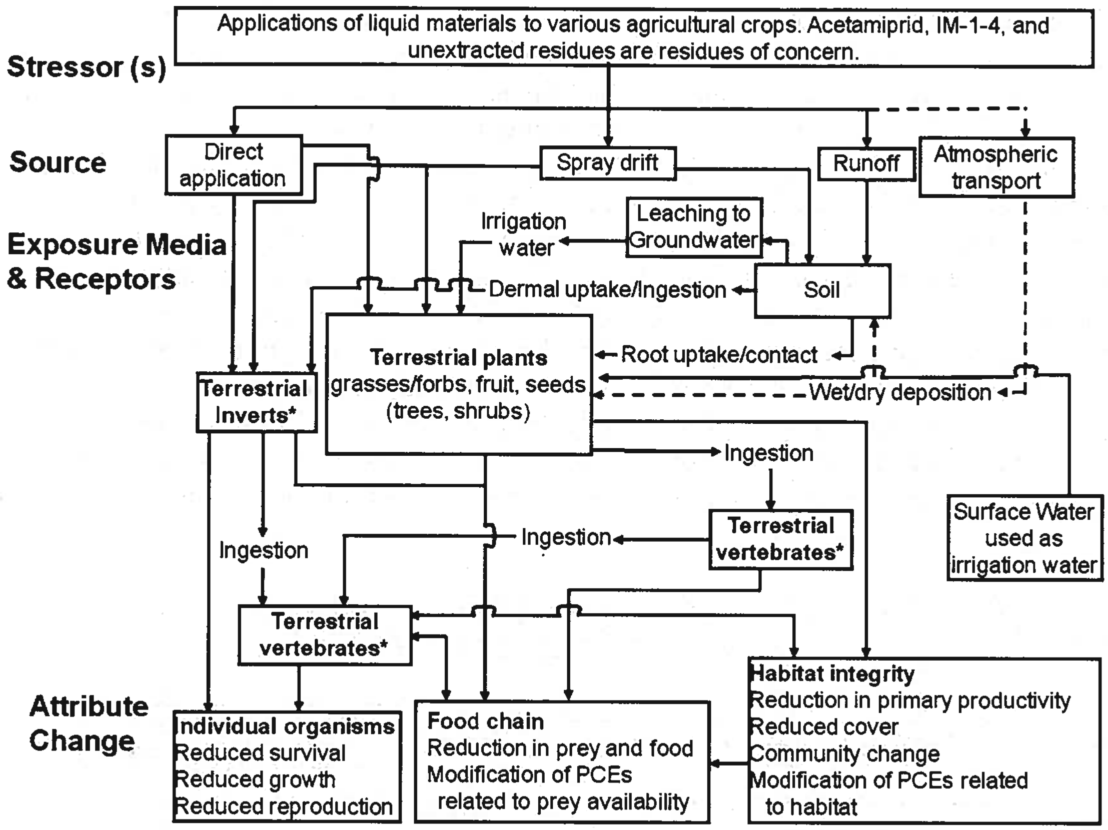


Figure 2-2. Conceptual model for potential effects of acetamiprid on terrestrial organisms from use on various agricultural crops. (Dotted lines indicate exposure pathways that have a low likelihood of contributing to ecological risk)

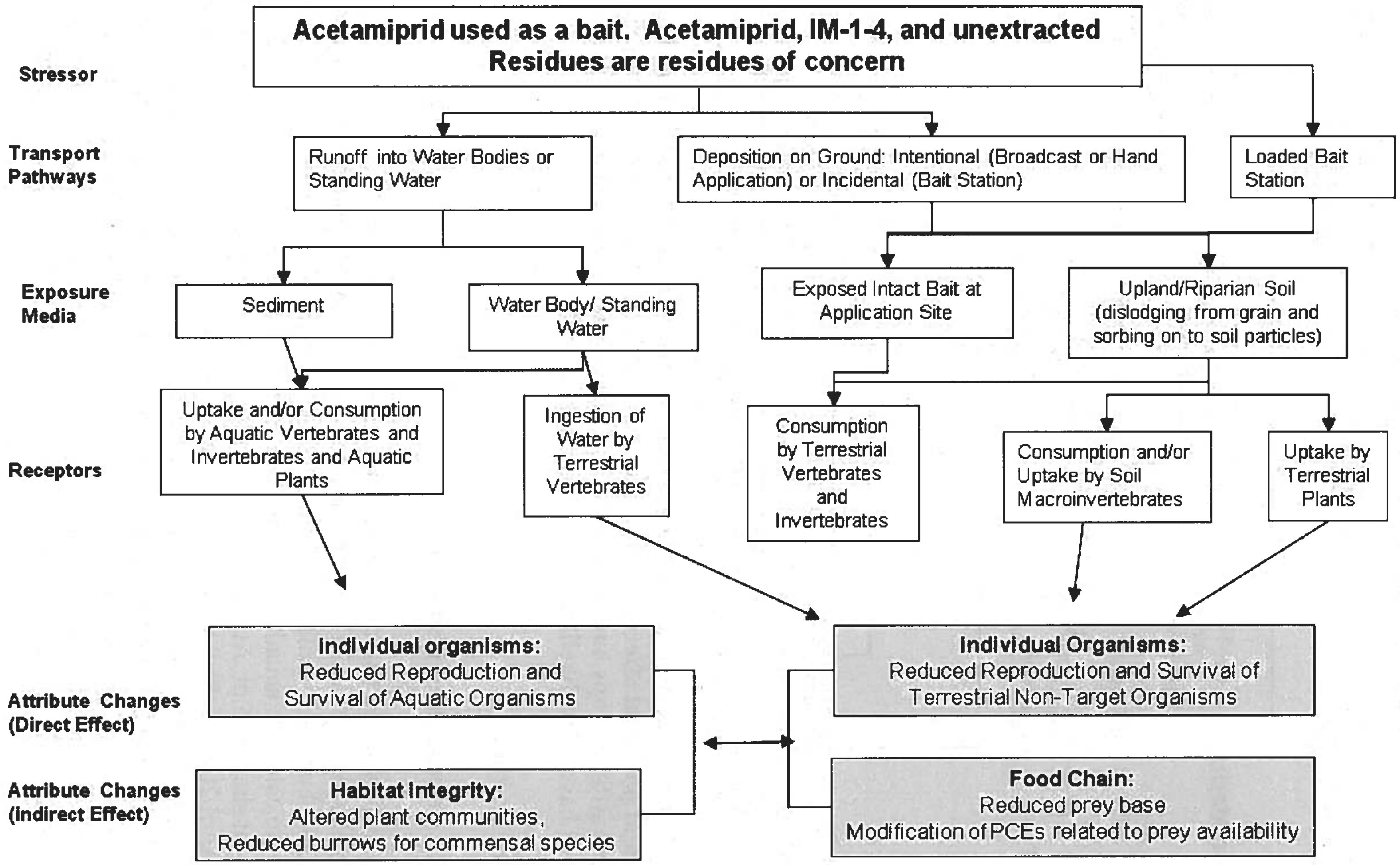


Figure 2-3. Conceptual model for potential effects of acetamiprid on aquatic and terrestrial organisms from use as a bait. (Dotted lines indicate exposure pathways that have a low likelihood of contributing to ecological risk)

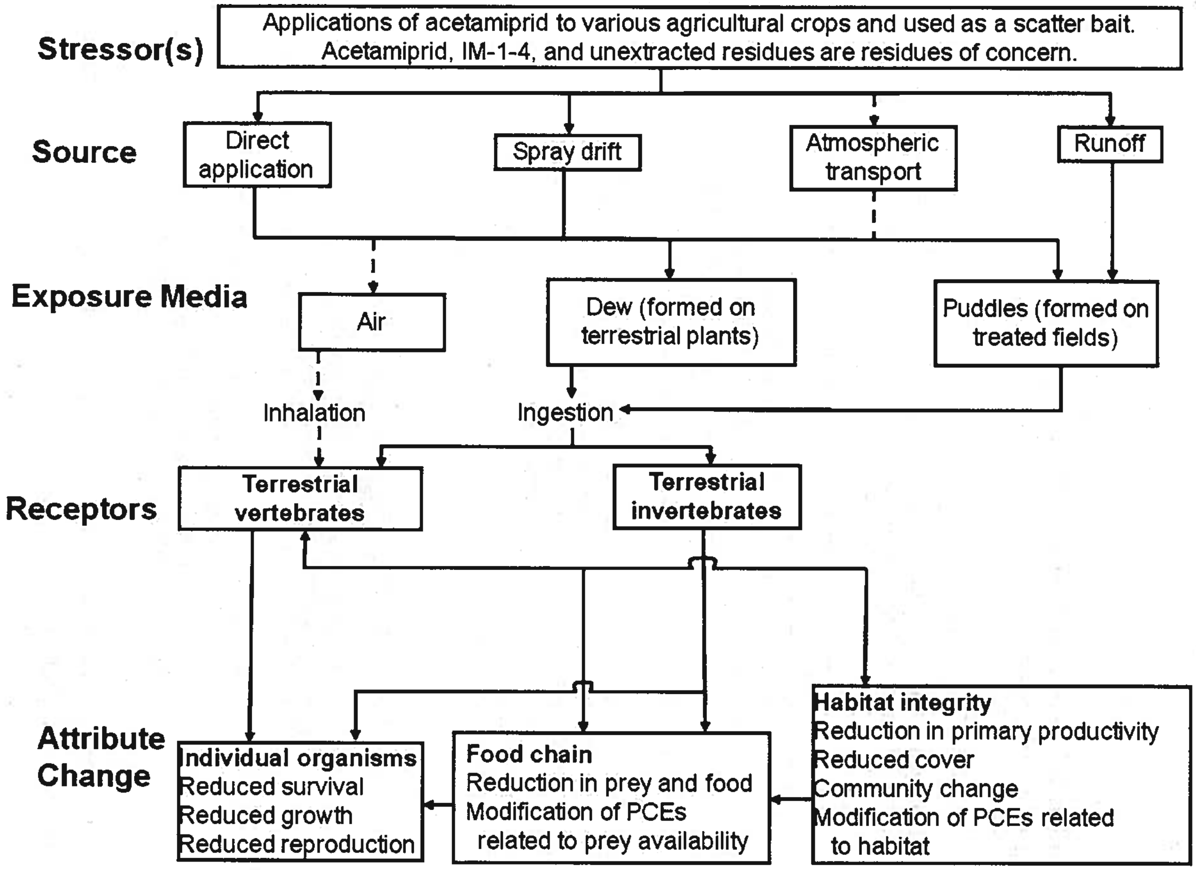


Figure 2-4. Conceptual model depicting stressors, drinking water and inhalation exposure pathways, and potential effects to terrestrial animals from the use of acetamiprid on various agricultural crops and when used as a scatter bait. (Dotted lines indicate exposure pathways that have a low likelihood of contributing to ecological risk)

2.5. Analysis Plan

2.5.A. Measures of Exposure

Measures of exposure are based on aquatic and terrestrial models that calculate estimated environmental concentrations (EECs) using maximum proposed application rates and methods. The Tier I model used to calculate aquatic EECs is GENEEC (v2.0, May 1, 2001). The Tier II models used to calculate aquatic EECs are the Pesticide Root Zone Model (v3.12.2, May 2005) coupled (input shell, pe5.pl, Aug 2006) with the Exposure Analysis Model System (EXAMS, v2.98.4.6, April 2005) (USEPA, 2011). The Terrestrial Residue Exposure Model (T-REX, version 1.4.1, 12/11/2008) is used to derive terrestrial EECs on food items (USEPA, 2008b). The TERRPLANT model (version 1.2.2, 12/26/2006) is used to derive drift-based and runoff-based EECs for estimating exposures to terrestrial plants inhabiting dry and semi-aquatic areas (USEPA, 2006). Aquatic models are parameterized using relevant use and environmental fate data according to EFED input parameter guidance (USEPA, 2009c). This assessment is not intended to represent a site or time-specific analysis; screening-level assessments are intended to be protective of wildlife on a national-level as opposed to being a regionally- or locally-specific.

Methods used to determine exposure of terrestrial organisms to acetamiprid for proposed crop and bait uses are described in Section 3.1.

2.5.A.i. Aquatic Exposure

The models used to predict aquatic EECs are the Tier I model GENeric Estimated Environmental Concentration (GENEEC) and the Tier II Pesticide Root Zone Model coupled with the Exposure Analysis Model System (PRZM/EXAMS). More information on these models is available on EPA's Water Models Website (http://www.epa.gov/oppefed1/models/water/) and User Manuals for the Models.

2.5.B. Measures of Effect

Measures of effect are obtained from a suite of registrant-submitted guideline studies which were conducted with a limited number of surrogate species (Table 2-3). The test species are not intended to be representative of the most sensitive species but rather were selected based on their ability to thrive under laboratory conditions. Toxicity testing reported in this risk assessment utilizes surrogate species to represent all freshwater fish (2000+) and bird (680+) species in the U.S. The ECOTOXicology database[8] (ECOTOX), was searched in order to provide additional ecological effects data (USEPA, 2009a). Data were available in ECOTOX for acetamiprid (CAS 135410207).

2.5.C. Integration of Exposure and Effects

Available exposure and toxicity data are compared in order to evaluate the risks of adverse ecological effects on non-target species. For this screening-level assessment, the risk quotient (RQ) method is used to compare exposure and toxicity values. The RQ method involves dividing EECs by acute and chronic toxicity values. The resulting RQs are then compared to the Agency's levels of concern (LOCs) (USEPA, 2004)(Table 2-3). These criteria are used to indicate if applications of acetamiprid, as directed on the proposed label, have the potential to cause adverse effects to non-target organisms. Although risk is often defined as the likelihood and magnitude of adverse effects, the RQ-based approach does not provide a quantitative estimate of likelihood and/or magnitude of an adverse effect, but rather provides a "yes" or "no" answer depending upon whether or not LOCs are exceeded.

Table 2-3. Agency risk quotient (RQ) metrics and levels of concern (LOC) for Federally-listed (listed) threatened/endangered and non-listed species per risk class.

Risk Class	Risk Description	RQ	LOC
Aquatic Animals (fish and invertebrates)			

[8] USEPA 2011. ECOtoxicology Database. http://cfpub.epa.gov/ecotox/

Risk Class	Risk Description	RQ	LOC
Acute	Potential for effects to non-listed animals from acute exposures	Peak EEC/LC_{50}[1]	0.5
Acute Restricted Use	Potential for effects to animals from acute exposures Risks may be mitigated through restricted use classification	Peak EEC/LC_{50}[1]	0.1
Acute Listed Species	Listed species may be potentially affected by acute exposures	Peak EEC/LC_{50}[1]	0.05
Chronic	Potential for effects to non-listed and listed animals from chronic exposures	60-day EEC/NOEC (fish) 21-day EEC/NOEC (invertebrates)	1
Terrestrial Animals (mammals and birds)			
Acute	Potential for effects to non-listed animals from acute exposures	EEC[2]/LC_{50} (Dietary) EEC/LD_{50} (Dose)	0.5
Acute Restricted Use	Potential for effects to animals from acute exposures Risks may be mitigated through restricted use classification	EEC[2]/LC_{50} (Dietary) EEC/LD_{50} (Dose)	0.2
Acute Listed Species	Listed species may be potentially affected by acute exposures	EEC [2]/LC_{50} (Dietary) EEC/LD_{50} (Dose)	0.1
Chronic	Potential for effects to non-listed and listed animals from chronic exposures	EEC [2]/NOAEC	1
Plants			
Non-Listed	Potential for effects to non-target, non-listed plants from exposures	EEC/ EC_{25}	1
Listed Plant	Potential for effects to non-target, listed plants from exposures	EEC/ NOEC EEC/ EC_{05}	1

3. Analysis

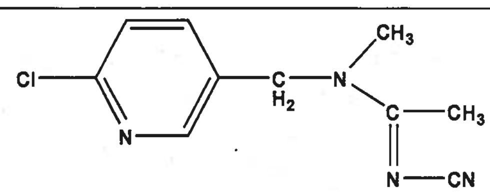
3.1. Environmental Fate and Transport Characterization

Acetamiprid will enter the environment via spray directly onto soil or foliage, via spreading of bait on surfaces, or via placing of bait into a bait station. It may move off-site via spray drift, leaching, and runoff. Acetamiprid is considered nonvolatile from dry non-adsorbing surfaces, water, and moist soil. It is not likely to bioconcentrate in aquatic or terrestrial organisms. Chemicals with half-lives greater than 60 days in soil, water, and sediment are considered persistent (USEPA, 2008c). Aerobic aquatic and soil metabolism half-lives for acetamiprid indicate that acetamiprid is not persistent; however, there is uncertainty in the half-lives due to significant amounts of unextracted, unidentified residues in the metabolism studies. If the unidentified residues are in fact the parent, the compound would be considered persistent. Primary routes of degradation are via aerobic soil and aerobic aquatic metabolism. Acetamiprid is stable to hydrolysis at 25°C and aqueous photolysis is not an important degradation pathway. Acetamiprid is classified as moderately mobile using the FAO classification system (K_{oc}s = 157-298 L/kg organic carbon) and it may be transported into surface and ground water. Acetamiprid has six identified degradates, five of which are major degradates (four organic and CO_2). Since generation of the previous assessment (USEPA, 2009, D364328), degradation kinetics have been recalculated using all data points in the degradation studies. Additionally, degradation kinetics have been calculated for the parent plus IM-1-4, and unextracted residues to allow estimation of exposure to all residues of concern in the aquatic environment.

Acetamiprid has a dissociation constant (pK_a) of 0.7 for the protonated form, indicating that its form will not change significantly at environmentally relevant pH. The vapor pressure, air-water partition coefficient (K_{AW}), and $C_{water+soil}/C_{air}$ indicate that it is nonvolatile from dry non-adsorbing surfaces, water, and moist soil using OCSPP[9] Guideline 835.6100 classifications. The log octanol-water partition coefficient (log K_{ow}) is 0.08 at 25°C and the log octanol-air partition coefficient (log K_{OA}) is 12.5 indicating it is not likely to bioconcentrate in aquatic or terrestrial organisms (Armitage and Gobas, 2007; Gobas *et al.*, 2003; USEPA, 2009d).

Table 3-1 summarizes the identity information and physical-chemical properties of acetamiprid. Table 3-2 summarizes other environmental fate data for the parent and provides half-lives for the parent and unextracted residues. Table 3-5 summarizes half-lives for the parent alone, residues of acetamiprid and IM-1-4, and residues of acetamiprid, IM-1-4, and unextracted residues. All of these half-life values are used to characterize assuming different residues of concern will have on the risk conclusions.

Table 3-1. Summary of physical-chemical properties of acetamiprid

PARAMETER	VALUE	SOURCE	COMMENTS
PC Code	099050	None	None
CAS Number	135410-20-7	(USNLM, 2009)	None
Structure			None

[9] Office of Prevention, Pesticides, and Toxic Substances (OPPTS) is now the Office of Chemical Safety and Pollution Prevention (OCSPP); however, the guidelines still reference OPPTS and so the guidelines are referenced with OPPTS in this document.

Chemical Name	N^1-[(6-chloro-3-pyridyl)methyl]-N^2-cyano-N^1-methylacetamidine	MRID 44651803	None
Molecular Weight	222.68	MRID 44651803	None
Water Solubility	4250 mg/L (25°C)	MRID 44651811	None
Vapor Pressure	$<1 \times 10^{-8}$ Torr at 25°C	MRID: 46235701	Nonvolatile from dry non-adsorbing surfaces (USEPA, 2010)
	7.50×10^{-10} Torr at 25°C 1×10^{-4} mPa at 25°C	(AERU, 2009)	
Henry's Law constant	5.2×10^{-14} atm-m^3/mol at 25°C (estimated)	(Estimated from vapor pressure and water solubility at pH 7 and 20°C)	Calculated with vapor pressure reported by AERU (2009).
Dissociation Constant (pKa)	0.7 at 25°C	(USEPA, 2002)	None
Log K_{OW}	0.8 at 25°C	MRID 44651883	Not likely to bioconcentrate (USEPA, 2010)
Air-water partition coefficient (K_{AW})	2.11×10^{-12} (log K_{AW} = -11.68)		Non-volatile from water (USEPA, 2010)
Octanol-air partition coefficient (K_{OA})	3.0×10^{12} (log K_{OA} = 12.5)		Not likely to biomagnify in terrestrial food chains[2] (Gobas *et al.*, 2003; USEPA, 2009d)
$C_{water+soil}/C_{air}$	2.63×10^{11} to 2.02×10^{12}		Non-volatile from moist soil (USEPA, 2010)

[1]All estimated values were estimated according to "*Guidance for Reporting on the Environmental Fate and Transport of the Stressors of Concern in Problem Formulations for Registration Review, Registration Review Risk Assessments, Listed Species Litigation Assessments, New Chemical Risk Assessments, and Other Relevant Risk Assessments*" (USEPA, 2010).

[2] A recent FIFRA Scientific Advisory Panel (SAP) reported, "Gobas *et al* (2003) concluded that chemicals with a log K_{OA} >5 can biomagnify in terrestrial food chains if log K_{OW} >2 and the rate of chemical transformation is low. However, further proof is needed before accepting these limits without reservations" (USEPA, 2009d). This was also supported by Armitage and Gobas's work completed in 2007 (Armitage and Gobas, 2007).

Table 3-2. Summary of environmental fate and transport properties of acetamiprid[6]

Parameter	Value(s)	Source / Study Classification	Comments
Hydrolysis[3] (days)	Half-life, linear regression[1]: Stable (pH 5, 7, 9 at 25°C) 50.8 (pH 9 at 35°C) 12.8 (pH 9 at 45°C)	MRID 44651876 Acceptable	None

Parameter	Value(s)	Source / Study Classification	Comments
Atmospheric Degradation (days)	Half-life: 0.140 (estimated)	(USEPA, 2009b) NA	Estimated Using EPIWeb Version 4.0
Aqueous Photolysis Half-life (days)	Half-life, linear regression[1]: 34[2] (pH 7, 25°C)	MRID 44988509 Acceptable	None
Soil Photolysis Half-life[4]	Data under review	MRID 48563501 Under Review	These data are in review.[7] The results of the study are not expected to change the risk conclusions.
Aerobic Soil Metabolism Half-life (days)	Half-life, nonlinear regression[1] at 20°C: Parent Only: 1.1, sandy loam 1.2, clay loam 1.0, clay loam Parent+Unextracted Residues 76, sandy loam 75, clay loam 99, clay loam	MRID 46255603 Supplemental – May be used in modeling	Only one replicate. Unextracted residues made up <1 to 31 % of applied radioactivity.
	Half-life, nonlinear regression[1] at 20°C: Parent Only: 2.8, sandy loam 0.90, silty clay loam 6, clay loam Parent+Unextracted Residues: 10, clay loam	MRID 44651881 Supplemental – May be used in modeling	Foreign soils. Unextracted residues made up approximately 20-40% at the end of the study (182 days); however, unextracted residues were not observed until most of the parent had degraded in the silty clay loam and sandy loam suggesting that the unextracted residues were not the parent compound.[5]
	Half-life, nonlinear regression[1] at 20°C: Parent Only: 1.4, loamy sand Parent+Unextracted Residues: 2.0, loamy sand	MRID 44699101 Supplemental – May be used in modeling	Foreign soils. Unextracted residues ranged from 2 to 17% of applied radioactivity. The identity of the unextracted residues is not known.
	Half-life, linear regression[1] at 25°C: 0.3, loamy sand	MRID 44651880 Supplemental – Not for use in modeling	Foreign soils. Not conducted under GLP.

Parameter	Value(s)	Source / Study Classification	Comments
	Half-life, linear regression[1] at 25°C: Parent Only: 3.5, loamy sand Parent+Unextracted Residues: 6.4, loamy sand	MRID 44651879 Acceptable	Biphasic degradation was observed with an initial 3.6 day half-life followed by a 75 day half-life.
Anaerobic Soil Metabolism Half-life (days)	Data under review	MRID 48554501 Under Review	These data are in review[7] The results of the study are not expected to change the risk conclusions.
Aerobic Aquatic Metabolism Half-life (days)	Half-life, nonlinear regression[1] at 25°C:Parent Only: 25, loamy sand sediment Parent+Unextracted Residues: 74, loamy sand sediment	MRID 44988513 Acceptable	Maximum of 38% unextracted residues. The identity of the unextracted residues is not known. Data available for only one sediment.
Anaerobic Aquatic Metabolism Half-life (days)	Half-life, linear regression[1] at 25°C: Parent Only: 325, loamy sand sediment Parent+Unextracted Residues: 568, loamy sand sediment	MRID 44988512 Acceptable	Data available for only one sediment.
Solid-water distribution coefficient (K_d) in L/kg	Average K_d at 20°C 0.39, loamy sand, pH 4.4 3.9, loam sand II, pH 6.2 1.1, silt loam, pH 6.6 3.5, clay, pH 7.5 4.1, sandy loam sediment, pH 5.6 Mean = 2.60 (standard deviation=1.72)	MRID 44651883 Acceptable	Coefficient of variation is 66%.
Freundlich solid-water distribution coefficient (K_F) in L/kg	K_F (1/n) at 20°C Parent: 0.33 (0.85), loamy sand, pH 4.4 3.0 (0.82), loam sand II, pH 6.2 1.0 (0.90), silt loam, pH 6.6 3.2 (0.91), clay, pH 7.5 3.2 (0.83), sandy loam sediment, pH 5.6	MRID 44651883 Acceptable	Sorption was dependent on concentration in some soils.

Parameter	Value(s)	Source / Study Classification	Comments
Organic-carbon normalized distribution coefficient (K_{oc}) in $L/kg_{organic\ carbon}$	Average K_{oc} at 20°C 157, loamy sand, pH 4.4 266, loam sand II, pH 6.2 251, silt loam, pH 6.6 298, clay, pH 7.5 164, sandy loam sediment, pH 5.6 Mean = 227 (standard deviation=63.26)	MRID 44651883 Acceptable	Coefficient of variation is 28%. The coefficient of variation is less than that for K_d values indicating that K_{oc} values will be better at predicting sorption across soils than K_d values. Moderately mobile according to FAO classification.
Terrestrial Field Dissipation Half-life (days)	Half-life, nonlinear regression[1]: 2.8, CA, Gilman loamy fine, Vinca rosea 14.1, FL, Astatula fine, tree ferns 4.2, NJ, Penn silt loam, garden mums	MRID 44988514 Supplemental	Degradate IM-1-2 converted to IM-1-4 in storage stability study and IM-1-4 was not stable. Residues in plants were not reported. Broadcast at 0.15 lbs ai/A with four applications. Parent was not detected below 15 cm.
	Half-life, linear regression[1]: 3, WA, Timerman coarse sandy loam, apples 6, FL, Candler sand soil, oranges 13, NY, Oakville loamy fine sand, cabbage 6, CA, Romona loam soil, cotton	MRID 44988515 Supplemental	Degradate IM-1-2 converted to IM-1-4 in storage stability study and IM-1-4 was not stable. Residues in plants were not reported. Broadcast at 0.15 lbs ai/acre with four applications. Parent was not detected below 15 cm. Conditions not favorable to leaching. Subset of data used to estimate half-life for FL and WA site.
	Half-life, linear regression[1]: 10.1, Prince Edward Island, Alberry sandy loam 5.2, Ontario, London loam 17.8, Manitoba, Ryerson clay loam	MRID 44988625 Supplemental	Pan evaporation data were not reported so water balances could not be determined. Storage stability data were not submitted for the test site soils. Acetamiprid was applied four times at 168 g ai/ha with a 7 day interval to bare plots in Canada. Parent not detected below 15 cm depth.

1 Degradation kinetics were calculated using the single first order decay equation using either nonlinear regression of non-transformed data or linear regression of natural log transformed data.

2 Value corrected to represent natural sunlight at 40°N latitude.

3 MRID 44651877 is unacceptable.

4 MRID 44988508 is unacceptable.

5 This indicates that the unextracted residues were not the parent compound. Unextracted residues in the clay loam appeared as the parent was lost the identity of unextracted residues is unknown.

6 This table shows half-lives for the parent and parent plus unidentified unextracted residues which may or may not be the parent. Table 3-5 summarizes half-lives calculated for acetamiprid plus IM-1-4 plus unextracted residues which were used in the calculation of modeling inputs.

7 These data were not reviewed for this assessment because it was submitted after some of the new uses were requested and there was not time to complete the reviews before completion of this assessment. It was determined not to be a requirement for the completion of this assessment because the results would not significantly change the estimated exposure.

3.1.A. Degradation/Transformation of Parent

The persistence of acetamiprid is uncertain because a large portion of residues in the metabolism studies were unidentified. Aerobic soil metabolism rates for the parent alone and for the parent and unextracted residues in some soils indicate it is not persistent.[10] However, considering both the parent and unextracted residues acetamiprid is persistent in some systems. Under anaerobic conditions acetamiprid is persistent.

Acetamiprid was stable to hydrolysis at 25°C and pH 5, 7, and 9; however, hydrolysis was observed at pH 9 at 35 and 45°C (MRID 44651876). This suggests that some hydrolysis may occur in the natural environment. The hydrolysis half-life at pH 9 and 35°C (95°F) was 51 days and at 45°C (113°F) it was 13 days.[11] The aqueous photolysis half-life of 34 days indicates that aqueous photolysis is a minor degradation pathway (MRID 44988509). Soil photodegradation data are not available.

The primary route of degradation for the parent compound is aerobic soil metabolism. There is uncertainty in the degradation of acetamiprid due to high levels of unextracted residues in metabolism studies. Therefore, to assess the impact of this uncertainty on the risk assessment, degradation rates were estimated in two ways: for the measured parent by itself, and for measured parent plus unextracted residues under the assumption that unextracted residues are also parent compound or are a residue of concern. Half-lives were also calculated for these combinations along with IM-1-4 because this degradate is considered a residue of concern for some taxa. In nine soils, aerobic soil metabolism rates for the parent ranged from <1 day to six days for the parent alone, and from two to 99 days for the parent plus unextracted residues. A study examining anaerobic soil metabolism in two soils has been submitted; however, it is still under review. The results of the study are not expected to have a significant influence on the EECs and risk conclusions. Aerobic aquatic metabolism rates were slower than aerobic soil metabolism rates: the half-life was 25 days for the measured parent, and 74 days for parent plus unextracted residues in one sediment (MRID 44988513). Anaerobic aquatic metabolism was much slower, with a half-life of 325 days in a loamy sand sediment (MRID 44988512). Examination of aerobic aquatic and anaerobic aquatic metabolism in two sediments representative of intended use sites are recommended by OPPTS Guideline 835.4300; however, data are only available on one sediment for both of the studies. Additional studies examining metabolism in sediments are not recommended at this time.

3.1.B. Field Dissipation

The terrestrial field dissipation of acetamiprid was studied at seven U.S. sites on various crops, and on bare ground plots at three sites in Canada. The application rate used in all studies was 0.15 lbs ai/A. This is lower than the maximum proposed application rate for use on tree nuts (0.18 lbs ai/A with four applications) and the maximum single application rate for use on citrus (0.25 lbs ai/A/single application with five applications but a maximum of 0.55 lbs ai/A/season).

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[10] International half-lives that are considered persistent in soil, water, and sediment range from greater than 60 days to greater than 365 days (USEPA, 2008c).

[11] These rates of degradation are environmentally relevant as 95°F and 113°F commonly occur in the United States.

The dissipation half-lives for acetamiprid applied to domestic food, fiber and ornamental crops ranged from three to 14 days for residues in 0 to 15 cm (MRIDs 44988514, 44988515). The dissipation half-lives for acetamiprid applied to bare ground plots (determined in Canadian soils) ranged from five to18 days (MRID 44988625). The submitted studies generally met guideline requirements. However, because the degradate IM-1-2 converts to IM-1-4 in frozen storage within a short period of time (approximately 1 month), and many of the samples were stored for much longer periods of time (over 600 days, lengths of storage for which storage stability data were not reported) prior to analysis, the patterns of formation and decline could not be determined accurately for these major degradates. Also, at several of the study sites, negative water balances (*i.e.*, greater evaporation/total water loss from the soil than the total water input) following the final application likely precluded the possibility of significant leaching. Soil characteristics and results of the field studies are presented in Table 3-3. All reported maximum values for degradates in Table 3-3 are for the period following the final application and represent individual replicates (U.S. sites) or replicate means (Canadian sites) from the 0- to 15-cm depth. In the studies conducted on cropped sites, the degradate IM-1-4 was detected at its maximum levels generally within two weeks of application.

Table 3-3. Terrestrial field dissipation study results.

MRID	Soil Texture	Study Site, Crop	Half-life in days	Max. Depth of Leaching	Maximum in µg/L		
					IM-1-4 [2]	IM-1-2 [2]	IC-0
44988515	sandy loam	WA, apples	3	0-15 cm (a,b,c)[3]	149	14	ND[4]
44988515	sand	FL, oranges	6	0-15 cm (a, b)	60	ND	ND
44988515	loamy sand	NY, cabbage	13	0-15 cm (a, b)	197	ND	ND
44988515	loam	CA, cotton	6	0-15 cm (a, b, c); 15-30 cm (d)	202	20	18
44988514	loamy sand	CA, vincarosea	3	0-15 cm (a, b, c); 30-45 cm (d)	425	26	45
44988514	sand	FL, tree ferns	14	0-15 cm (a, b, d)	147	ND	12
44988514	silt loam	NJ, garden mums	4	0-15 cm (a, b, d)	191	ND	23
44988625	sandy loam	Prince Ed. Isl., CAN., Bare ground	10	0-15 cm (a, b, c, d)	135.0	17.0	14.5
44988625	loam	Ontario, CAN.	5	0-15 cm (a, b, c, d)	82.0	87.5	34.5

MRID	Soil Texture	Study Site, Crop	Half-life in days	Max. Depth of Leaching	Maximum in µg/L		
					IM-1-4 [2]	IM-1-2 [2]	IC-0
44988625	clay loam	Manitoba, CAN., bare ground	18	0-15 cm (a, b, c, d)	41.0	68.0	17.5

[1] Acetamiprid was applied at all sites using four applications at intervals ranging from 6 to 9 days.
[2] IM-1-2 converts to IM-1-4 under storage conditions. IM-1-2 concentrations shown are likely to be lower than those that occurred in the field.
[3] a = parent; b = IM-1-4; c = IM-1-2; d = IC-0.
[4] ND = not detected.

3.1.C. Degradates/Transformation Products

Transformation products resulting from the environmental degradation of acetamiprid are:

- N-methyl(6-chloro-3-pyridyl)methylamine (IM-1-4)
- (E)-N1-[(6-chloro-3-pyridyl)-methyl]-N2-cyano-N1-methylacetamidine (IM-1-5)
- 6-chloronicotinic acid (IC-0)
- N^2-carbamoyl-N^1-((6-chloro-3-pyridyl)-methyl)-N^1-methylacetamidine (IM-1-2)
- 6-chloro-3-pyridylmethano (IM-0)
- N-((6-chloro-3-pyridyl)methyl)-N-methylacetamide (IM-1-3)
- Carbon dioxide

Structures of these degradates and the maximum percent of applied radioactivity present as the specified degradate is shown in are shown in Appendix A. IM-1-4, IM-1-5, IC-0, IM-1-2, and IM-1-3 were present at greater than 10% applied radioactivity and are considered major degradates. The 2009 new use assessment for acetamiprid identified IM-1-4 as the only residue of concern and it was assumed to have similar toxicity to the parent (USEPA, 2009, D364328). A total toxic residues (TTR) approach was used in the previous risk assessment and the same approach is used in estimating exposure in this risk assessment. The only residue of concern for human health drinking water is the parent compound. Table 3-5 provides the half-lives estimated for parent with IM-1-4 and parent with IM-1-4 plus unextracted residues. Hydrolysis and aqueous photolysis data for IM-1-4 indicate it is stable to these degradation processes and that IM-1-4 has sorption coefficients similar to those of the parent (Table 3-2). The maximum depth that IM-1-4 was detected in terrestrial field dissipation studies was 15 cm. Appendix A contains additional environmental fate data submitted on IC-0.

Table 3-4. Summary of environmental fate and transport properties of IM-1-4.[6]

Parameter	Value(s)	Source/ Study Classification	Comments
Hydrolysis[3] (days)	Stable (pH 4, 7, 9 at 50°C)	MRID 44651877 Supplemental	Study duration was five days and at 50°C. Greater than 99% of applied residues were IM-1-4 at the end of the study.

Parameter	Value(s)	Source/ Study Classification	Comments
Aqueous Photolysis Half-life (days)	Stable (pH 7, 25°C)	MRID 44988511 Valid	None
Solid-water distribution coefficient (K_d) in L/kg	Average K_d at 20°C 0.38, loamy sand , pH 4.4 6.48, loam sand II, pH 6.4 5.63, silt loam, pH 6.6 21.9, clay, pH 7.5 4.08, sandy loam sediment, pH 5.6 Mean = 7.69 (standard deviation=8.28)	MRID 44651885 Valid	Coefficient of variation is 108%.
Freundlich solid-water distribution coefficient (K_F) in L/kg	K_F (1/n) at 20°C 0.29, loamy sand , pH 4.4 5.35, loam sand II, pH 6.4 4.34, silt loam, pH 6.6 17.0, clay, pH 7.5 2.84, sandy loam sediment, pH 5.6 Mean = 5.97 (standard deviation=6.45)	MRID 44651885 Valid	Sorption was dependent on concentration in some soils. All 1/n values were all ess than 0.90.
Organic-carbon normalized distribution coefficient (K_{oc}) in $L/kg_{organic\ carbon}$	Average K_{oc} at 20°C 153, loamy sand , pH 4.4 440, loam sand II, pH 6.4 1278, silt loam, pH 6.6 1842, clay, pH 7.5 163, sandy loam sediment, pH 5.6 Mean = 775 (standard deviation=753)	MRID 44651885 Valid	Coefficient of variation is 97%. The coefficient of variation is less than that for K_d values indicating that K_{oc} values will be better at predicting sorption across soils than K_d values. Moderately mobile to slightly mobile according to FAO classification.

3.1.D. Mobility/Sorption

Acetamiprid is classified as moderately mobile with organic carbon normalized soil-water distribution coefficients (K_{oc}) ranging from 157 to 298 $L/kg_{organic\ carbon}$ measured in four soils and one sediment (MRID 44651883)[12]. The coefficient of variation for K_{oc} values (28%) is less than that for K_d values (66%) indicating that K_{oc} values will be better at predicting sorption across soils than K_d values. Based on the sorption coefficients and persistence, acetamiprid has the potential to reach ground water, especially in vulnerable sandy soils with low organic-carbon

[12] Classificaiton is based on the FAO classification system (USEPA, 2010)

content and/or the presence of shallow ground water. However, the maximum depth it was detected in terrestrial field dissipation studies was 15 cm.

Table 3-5. Summary of half-lives estimated for residues of parent, IM-1-4, and Unextracted residues in metabolism studies.

Type of Study (MRID)	Study System	Half-life (days)*		
		Parent Only	Parent + IM-1-4	Parent+IM-1-4+Unextracted Residues
Aerobic Soil (44651881)	Silty Clay Loam, 20°C	0.9	1.1	1.1
	Clay Loam, 20°C	6	104	392
	Sandy Loam, 20°C	2.8	118	299
Aerobic Soil (46255603)	Sandy Loam, 20°C	1.1	2.4	72
	Clay Loam, 20°C	1.2	2.4	67
	Clay Loam, 20°C	1.0	1.7	84
Aerobic Soil (44699101)	Loamy Sand, 20°C	1.4	20	53
Aerobic Soil (44651879)	Loamy Sand, 25°C	3.5	430	895
Aerobic Aquatic (44988513)	Loam Sand, 25°C	25	215	658
Anaerobic Aquatic (44988512)	Loamy Sand, 25°C	325	590	1372

*All values were estimated using nonlinear regression and the single first order equation.

3.1.E. Monitoring Data

The following databases and sources were searched on July 5, 2011 for monitoring information on acetamiprid:

- The United States Environmental Protection Agency (USEPA) STORET Database (http://www.epa.gov/storet/dbtop.html)
- The United States Geological Survey (USGS) National Water-Quality Assessment (NAWQA) Program Data Warehouse (http://infotrek.er.usgs.gov/traverse/f?p=NAWQA:HOME:1405517206944567)
- The USGS National Stream Quality Accounting Network (NASQAN) program (http://water.usgs.gov/nasqan/)

No monitoring data are available as none of the databases reported looking for acetamiprid.

3.2. Measures of Aquatic Exposure

3.2.A. Estimated Concentrations in Surface Water

3.2.A.i. Model Inputs

The Tier II screening simulation models Pesticide Root Zone Model (PRZM v3.12.2, May 2005) and EXposure Analysis Modeling System (EXAMS v2.98.04.06, Apr. 2005) were coupled with the input shell PE (v5.0, Nov. 2006) to generate EECs of acetamiprid TTR that may occur in surface water from use on adjacent crops at the proposed maximum use rates (Table 3-6).

The appropriate PRZM and EXAMS input parameters for acetamiprid and IM-1-4 residues were selected from the environmental fate data submitted by the registrant and in accordance with US EPA-OPP EFED water model parameter selection guidelines, *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides*, Version 2.1, October 22, 2009 and *PE5 User's Manual. (P)RZM (E)XAMS Model Shell, Version (5)*, November 15, 2006. Input parameters can be grouped by physical-chemical properties and environmental fate data, application information, and use scenarios. Physical and chemical properties relevant to assess the behavior of acetamiprid and IM-1-4 in the environment are presented in Table 3-1, Table 3-2, and Table 3-5 and application information from the label. All of the uses on the label were evaluated in this assessment because all uses were not previously evaluated with inclusion of IM-1-4 and unextracted residues, which are now considered residues of concern. The input parameters used in PRZM and EXAMS are listed in Table 3-6. Appendix B contains example model output files and Appendix I GENEEC results.

Coefficients of variation (CV) were lower for organic-carbon normalized solid water distribution coefficients (K_{OC}; CV=28%) as compared to solid-water distribution coefficients (K_d; CV=66%) (MRID 44651884). Therefore, the mean K_{oc} (227 L/kg$_{\text{organic carbon}}$) was used to estimate acetamiprid concentrations in surface water. When a total toxic residue approach is used in modeling the sorption data for the most mobile compound in the residues is used as the input for sorption coefficients; however, data are not available for IM-1-4 and this is an uncertainty in the risk assessment. Data are not available on the mobility of IM-1-4 and it is predicted to be more mobile than the parent. The aerobic soil metabolism input values used in surface water modeling are 90th percentile upper confidence bound on the mean of eight half-life values calculated for total residues of parent and IM-1-4 and eight half-life values calculated for the parent and IM-1-4 plus unextracted residues (MRIDs 46255603, 44651881, 44699101, 44651879).[13] The aerobic soil metabolism value from MRID 44651880 was not used in modeling because the study was conducted using a foreign soil. The uses on agricultural crops allow for ground, aerial, and airblast applications of a flowable material. The scatter bait is applied as a dry material on surfaces or placed in a bait station and no spray drift is expected with this use. The scatter bait use is evaluated as a granule formulation. Data on aerobic aquatic metabolism in one loamy

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[13] The values used to calculate the 90th percentile value were 0.9, 104, 118, 2.4, 2.4, 1.7, 20, and 430 days for parent and IM-1-4 and 1.1, 392, 299, 72, 67, 84, 53, and 895 days for parent, IM-1-4, and unextracted residues. In previous ecological risk assessments results from MRID 46255603 were not used in modeling. The results from this study were used in modeling in this assessment. The main deficiency in the study was that there was only one replicate.

sand sediment were available and resulted in the following half-lives: 25 days for parent alone, 215 days for parent and IM-1-4, and 658 days for parent, IM-1-4, and unextracted residues in a loamy sand (MRID 44988513). Data on anaerobic aquatic metabolism were available in one sediment and resulted in the following half-lives: 325 days for parent alone, 590 days for parent and IM-1-4 and 1372 days for parent, IM-1-4, and unextracted residues (MRID 44988512). As per guidance, these values were multiplied by three to obtain the model input values of 75, 645, and 1974 days for aerobic aquatic metabolism and 975, 1770 and 4116 days for the anaerobic aquatic metabolism study. The 34-day aqueous photolysis half-life input value reflects corrections for continuous illumination as well as for latitude/season to reflect photolysis in summer sunlight at 40° N latitude.

Table 3-6. Summary of PRZM/EZAMS Environmental Fate Inputs Used to Estimate Aquatic Exposure to Acetamiprid, IM-1-4, and Unextracted Residues

Fate Property	Value	Source	Comment
Molecular Weight	222.68 g/mole	MRID 44651803	Value for acetamiprid
Henry's constant	5.2×10^{-14} atm-m^3/mole	NA	Estimated from vapor pressure and water solubility at pH 7 and 20°C for acetamiprid from AERU, 2009.
Vapor Pressure	7.5×10^{-10} Torr	(AERU, 2009)	Value for acetamiprid
Solubility in Water	4250 mg/L	MRID 44651811	Value for acetamiprid
Photolysis in Water	34 days	MRID 44988509	
Aerobic Soil Metabolism Half-lives	Parent Only: 3.1 Parent+IM-1-4: 159 Parent+IM-1-4+Unextracted Residues: 383 Parent+Unextracted Residues: 55	MRID 46255603, 44651881, 44699101, 44651879	The 90th percentile upper confidence bound on the mean of eight values. The different values were used to characterize the effects of considering different residues of concern on the risk assessment.
Hydrolysis	0 (Stable)	MRID 44651876	
Aerobic Aquatic Metabolism (water column)	Parent Only: 75 Parent+IM-1-4: 645 Parent+IM-1-4+Unextracted Residues: 1974 Parent+Unextracted Residues: 222	MRID 44988513	Measured value times three to account for uncertainty associated with using a single value.
Anaerobic Aquatic Metabolism (benthic)	Parent Only: 975 Parent+IM-1-4: 1770 Parent+IM-1-4+Unextracted Residues: 4116 Parent+Unextracted Residues: 1704	MRID 44988512	Measured value times three to account for uncertainty associated with using a single value.

Fate Property	Value	Source	Comment
Organic-carbon water partition coefficient (K_{OC}, L/kg OC) or Solid-water distribution coefficient (Kd, L/kg soil)	227 L/kg	MRID 44651884	Mean of five K_{OC} values. CV for K_{OC} values were 28% versus 66% for K_d values.
Application rate and frequency	See **Table 3-9**		Various scenarios were modeled
Chemical Application Method (CAM)	1 for surface applied for bait applications 2 for foliar applied for agricultural crops	Determined by label instructions	
Application Efficiency	0.95 for aerial 0.99 for ground and airblast 0.99 for bait		The application efficiency for granular formulations is not specified in the input parameter guidance. This value was assumed.
Spray Drift Fraction	0.03 for airblast 0.04 for aerial (soybean) 0.05 for aerial (other agricultural crops) 0.01 for ground 0 for bait		The spray drift fraction for granular formulations is not specified in the input parameter guidance. This value was assumed. See text.
Incorporation Depth	0 and 4 cm[2]	Based on label instructions.	
Post-harvest foliar pesticide disposition IPSCND	1 for surface applied	Guidance document[1]	
Runoff Flow	None		

[1] Inputs determined in accordance with EFED "*Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version 2.1*" (USEPA, 2009c).
[2] A value of 0 was used for input for the soil incorporation depth for both CAM 1 and CAM 2. CAM 1 has a default soil incorporation depth of 4 cm and CAM 2 reflects applications to foliage.

The Justice Insecticide label (soybean use) specifies different vegetative buffer distances for different types of applications. These buffers could reduce the spray drift fraction that enters a water body. Therefore, the spray drift fraction with a buffer was estimated using AgDRIFT version 2.01. The default spray drift fraction assumed for aerial applications is 0.05 and the estimated spray drift fraction using AgDRIFT and assuming a 150-foot buffer as specified on the label results in a spray drift fraction of 0.04.[14] This value was used in modeling to account for the presence of a vegetative buffer. The estimated spray drift fraction for ground and airblast applications with a 25-foot buffer is 0.02. This value is higher than the default value of 0.01. Therefore, for ground applications the default value of 0.01 was used in modeling.

[14] "*Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version 2.1*" specifies the default spray drift fractions used in water modeling in EFED (USEPA, 2009c).

Table 3-7. Spray Drift Fraction Estimated using AgDRIFT version 2.01

Application Method	Buffer Distance (feet)	Spray Drift Fraction
Aerial[1]	150	0.04
Ground[2]	25	0.02
Airblast[3]	25	0.02

[1] Tier I Aerial analysis was used assuming ASAE fine to medium drop size distribution (DSD) and an aquatic analysis for the EPA Pond.
[2] Tier I Ground analysis was used assuming high boom, ASAE fine to fine DSD based on label, 90th data percentile and an aquatic analysis for the EPA pond.
[3]Tier I Orchard/Airblast was used assuming a sparse (Young/dormant) orchard and an aquatic analysis for the EPA pond.

Scenarios are used to specify soil, climatic, and agronomic inputs in PRZM, and are designed to result in high-end water concentrations associated with a particular crop or and pesticide within a geographic region. Each PRZM scenario is specific to a location. Soil and agronomic data specific to the location are built into the scenario, and a specific climatic weather station providing 30 years of daily weather values is associated with the location. Table 3-9 identifies the use sites associated with each PRZM scenario and Table 3-8 specifies the location, soil type, curve number, dates the crop is present, and time of year with the most rainfall for select PRZM scenarios. Table B1 in Appendix B provides the information in Table 3-8 for all PRZM scenarios used in modeling in this assessment. The information in Table 3-8 and Table B1 is used to select the application date used in modeling for each scenario. For applications to agricultural crops, the date of application was chosen as the day when the crop was present on the field and during a period of generally high rainfall as it is expected that acetamiprid may be used when the crop is on the field and during periods of high rainfall. Crop-specific management practices were used for modeling, including application rates, number of applications per year, application intervals, and the first application date for each crop. For bait applications, the date of application was chosen to coincide with a month with high levels of precipitation, as use of the bait is not specific to the presence of a crop.

Table 3-8. Characteristics of PRZM/EXAMS Scenarios Used to Estimate Concentrations of Acetamiprid, IM-1-4, and Unextracted Residues in the Aquatic Environment.[1]

Modeling Scenario	Location of Meteorological File	Hydrologic Group of Soil (SCS Curve Number)	Crop Present (MM/Day – MM/Day)	Months with Highest Precipitation[2]	Application Dates Modeled (MM/Day)
FLcucumberSTD.txt	West Palm Beach, FL	C (91, 87, 88)	10/16 – 12/10	September (October when crop is present)	09/01
GApecansSTD.txt	Tallahassee, FL	C (84, 79, 82)	04/16 – 10/01	June	06/01
MSsoybeansSTD.txt	Yazzo County, MS	C (87, 84, 86)	04/16 – 10/10	November - May	04/16
PAturfSTD.txt	Harrisburg, PA	C (74, 74, 74)	04/01 – 11/01	June	06/01

1- Information on the scenarios was obtained from *Pesticide Root Zone Model Field and Orchard Crop Scenario Metadata (*April 5, 2006) and Metatdata files for RLF Scenarios.
2- Weather data collected from U.S. Weather. Average temperatures and rainfall in U.S. cities. (http://countrystudies.us/united-states/weather/) or The weather channel (http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0406)

3.2.A.ii. Results

The EECs of acetamiprid residues were estimated for parent alone, parent plus IM_1-4 residues, and parent plus IM-1-4 plus unextracted residues. Acetamiprid and IM-1-4 are considered residues of concern, and it is not known if the unextracted residues included parent or IM-1-4. Therefore, EECs for parent plus IM-1-4 plus unextracted residues conservatively represent potential exposures to all potential residues of concern and are used to calculate risk quotients. EECs for parent and IM-1-4 characterize exposure to residues of known concern. Comparison with EECs for the parent alone may be used to better understand the impact of assuming that IM-1-4 is as toxic as the parent. EECs for parent alone and for parent plus IM-1-4 were calculated for the scenario that resulted in the highest EECs for parent plus IM-1-4 plus unextracted residues.

Peak, 21-day, and 60-day EECs for the combined parent, IM-1-4, and unextracted residues were all very similar for each individual scenario. All EECs ranged from 0.72 to 69 µg/L. For the agricultural uses, the use scenario for cucurbits (represented by FLcucumberSTD.txt) resulted in the highest PRZM/EXAMS EECs. For the FLcucumber.txt scenario, ground, airblast, and aerial applications resulted in similar peak, 21-day, and 60-day EECs which ranged from 64 to 66 µg/L for the combined parent, IM-1-4, and unextracted residues. EECs for the parent and IM-1-4 (calculated for the highest EECs only) were also very similar and ranged from 33 to 35 µg/L. EECs of parent alone for the FLcucumber.txt scenario which is the representative scenario for cucurbits were 5 to 7 µg/L. The combined parent, IM-1-4, and unextracted residue EECs were two times the EECs for the parent plus IM-1-4, and 10 to 13 times the EECs for parent alone. PRZM/EXAMs EECs for the bait application ranged from 51 to 52 µg/L for combined parent, IM-1-4, and unextracted residues when 24 applications were assumed, and were 2.0 to 2.1 µg/L when one application was modeled.

GENEEC is simpler than the PRZM and EXAMS models in its treatment of hydrology. The linked PRZM and EXAMS models simulate the impact of daily weather on a treated agricultural field over a period of thirty years. During this time, pesticide may be washed off of the field into the water body by twenty to forty rainfall/runoff events per year. Because the simulated pond has no outlet is allows no discharge of water or pesticide. Sufficiently slowly-degrading compounds can thus continue to build up in the pond over the duration of a simulation, with each new addition of pesticide (associated with spray drift or runoff) adding to residues left over from previous additions of pesticide. GENEEC, by contrast, is a single event model, which represents the effect of a single large rainfall/runoff event and associated transport of pesticide from the field to the water. Long-term, multiple-day average concentrations are calculated in GENEEC based on the peak daily value and subsequent values considering degradation processes within the pond. PRZM/EXAMS simulations conservatively represent long-term accumulation within the pond. Thus for slowly-degrading pesticides, PRZM/EXAMS allows for accumulation of pesticides in the pond with year after year applications while GENEEC does not. As acetamiprid combined residues are relatively stable, sufficient chemical remains in the pond a year after application in the PRZM/EXAMS simulations, to allow continuous build-up over time. The effect is illustrated in Figure 3-1, which shows estimated EECs increasing year after year for some scenarios. For this reason, GENEEC results are included in Appendix I.

Table 3-9. Aquatic Estimated Environmental Concentrations (EECs) for Acetamiprid, IM-1-4, and Unextracted Residues (µg/L) (Estimated Using PRZM/EXAMs and GENEEC).

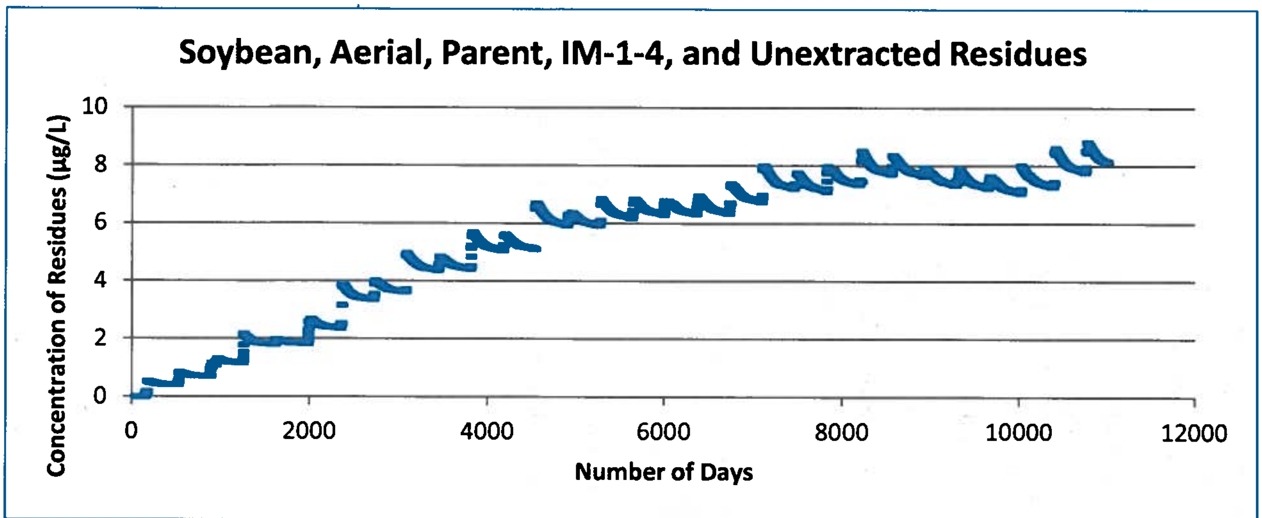
Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate		#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L)		
			lbs. ai/A	kg ai/ha				peak	21-day	60-day
Cotton	CAcotton_wirrigSTD.txt	01-05	0.10	0.11	4	7	Air	9.55	9.49	9.36
	MScottonSTD.txt	01-05					Air	41.03	40.70	40.30
	NCcottonSTD.txt	01-05					Air	52.88	52.63	52.27
		01-05					Ground	47.90	47.71	47.48
Leafy Vegetables	FLcabbageSTD.txt	01-02	0.075	0.084	5	7	Air	39.18	38.73	38.14
	CAlettuceSTD.txt	01-02					Air	47.62	47.37	46.98
							Ground	42.55	42.26	41.79
Leafy Cole Crops	FLcabbageSTD.txt	01-02	0.1	0.11, 0.11, 0.11, 0.09	4	7	Air	38.77	38.56	38.24
	CAlettuceSTD.txt	01-02					Air	50.48	50.23	49.73
							Ground	45.73	45.50	45.11
Fruiting Vegetables (within Crop Group 8-10)	CAtomato_wirrigSTD.txt	01-03	0.075	0.084	4	7	Air	8.87	8.78	8.68
	FLtomatoSTD_v2.txt	01-03					Air	29.52	28.97	28.56
	PAtomatoSTD.txt	01-09					Air	21.16	21.09	20.93
	FLpepperSTD.txt	01-05					Air	29.80	29.49	29.02
		01-09					Ground	27.01	26.72	26.29
Citrus (within Crop Group 10-10)[2]	CAcitrus_WirrigSTD.txt	01-01	0.25d	0.28	2d	7	Air	11.27	11.17	11.01
	FLcitrusSTD.txt	01-09					Air	57.75	57.13	56.57
			0.11d	0.12	5	7	Air	61.96	61.40	60.69
							Ground	57.31	56.80	56.20
							Airblast	60.76	60.22	59.56
Tuberous and Corm Vegetables (within Crop	Idpotato_WirrigSTD.txt	01-06	0.075	0.084	4	7	Air	11.30	11.28	11.18
	NCsweetpotatoSTD.txt	01-06					Air	26.12	25.89	25.51

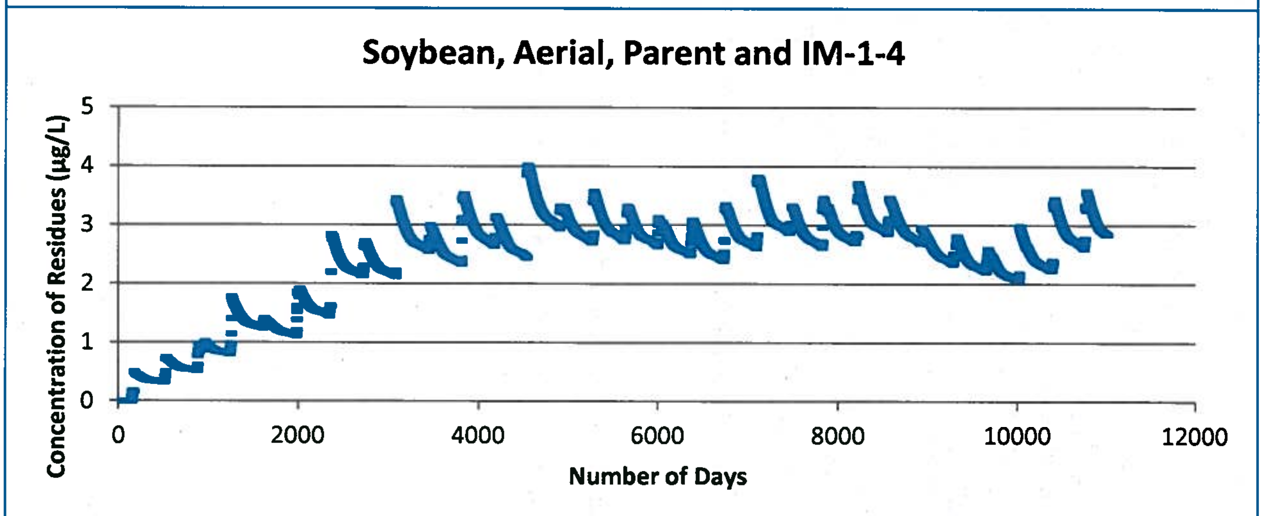
Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate lbs. ai/A	Single App. Rate kg ai/ha	#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L) peak	Estimated Surface Water Concentrations (µg/L) 21-day	Estimated Surface Water Concentrations (µg/L) 60-day
Sub-group 1C)[2]	MEpotatoSTD.txt	01-06					Air	27.86	27.73	27.62
		01-06					Ground	21.52	21.43	21.31
Tobacco[2]	NCtobaccoSTD.txt	01-06	0.075	0.084	4	7	Air	14.66	14.55	14.41
							Ground	10.11	10.04	9.95
Grapes and Other Climbing Small Fruits	CAgrapes_WirrigSTD.txt	01-02	0.10	0.11	2	14	Air	5.08	5.04	50.25
	NYgrapesSTD.txt	01-09					Air	16.73	16.67	16.60
							Ground	12.91	12.88	12.84
							Airblast	15.06	15.00	14.94
Stone Fruit (within crop Group 12)	GApeachesSTD.txt	01-07	0.15	0.17	4	10	Air	14.46	14.33	14.14
	CAfruit_WirrigSTD.txt	16-01					Air	17.28	17.17	17.02
	MIcherriesSTD.txt	01-06					Air	44.51	44.29	44.02
							Airblast	38.39	38.25	38.15
							Ground	31.23	31.16	30.93
Cucurbits (within Crop Group 9)	NJmelonSTD.txt	01-07	0.10	0.11	5	5	Air	45.34	44.48	43.39
	MImelonSTD.txt	01-06					Air	27.87	27.73	27.53
	MOmelonSTD.txt	10-04					Air	29.01	28.75	28.30
	FlcucumberSTD.txt	01-09					Air	**69.21** **32.12[a]** **6.93[b]** **16.43[g]**	**68.49** **32.24[a]** **6.17[b]** **16.27[g]**	**67.35** **33.24[a]** **5.02[b]** **14.53[g]**
							Ground	65.51	64.83	63.74
Tree Nuts (within Crop Group 14, including Pistachio)[2]	Caalmond_WirrigSTD.txt	16-01	0.18	0.20	4	14	Air	24.37	24.28	24.09
	ORfilbertSTD.txt	11-09					Air	47.45	47.29	46.50
	GApecanSTD.txt	01-06					Air	47.76	47.26	46.73
							Airblast	44.03	43.55	43.11
							Ground	38.87	38.39	38.06

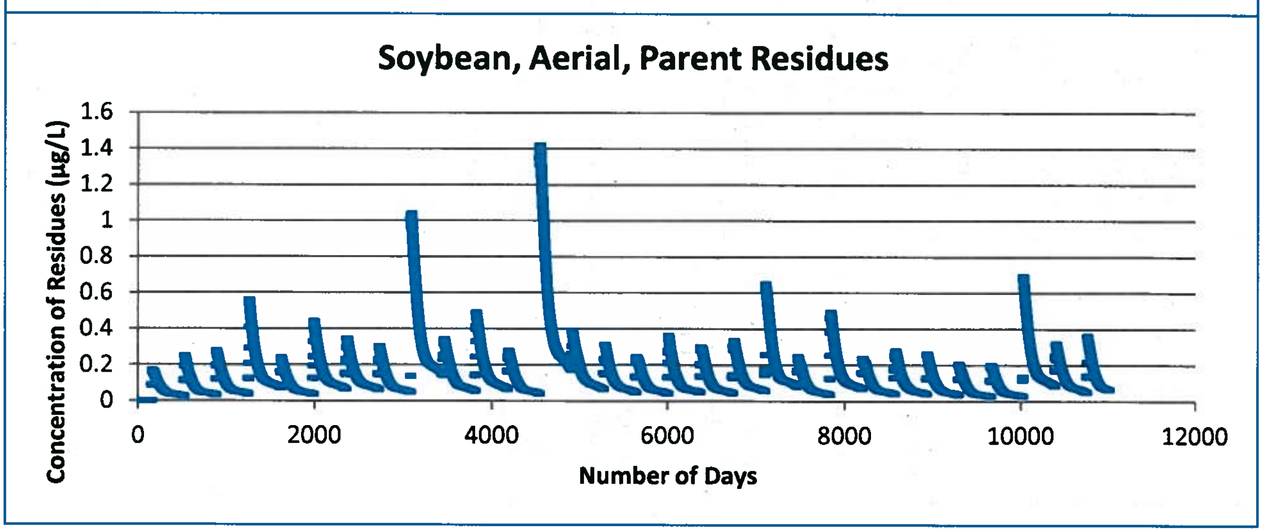
Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate		#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L)		
			lbs. ai/A	kg ai/ha				peak	21-day	60-day
Legume	MIbeansSTD.txt	01-09	0.10	0.11	3	7	Air	43.83	43.72	43.54
							Ground	38.86	38.75	38.57
Strawberries and Berries	Flstrawberry_wirrigSTD.txt	01-02	0.13	0.15	2	7	Air	28.93	28.77	28.54
		01-02					Ground	26.36	26.22	26.02
Blueberries and Other Bush Berries	ORberriesOP.txt	07-04	0.085	0.10	5	7	Air	5.76	5.71	5.63
	NYGrapesSTD.txt	01-09					Air	36.75	36.64	36.57
							Airblast	32.84	32.72	32.63
							Ground	27.92	27.83	27.73
Onions and Other Bulb Vegetables	CAonion_WirrigSTD.txt	16-01	0.15	0.17	4	7	Air	15.87	15.74	15.60
	GAonion_WirrigSTD.txt	15-09					Air	31.82	31.59	31.25
							Ground	25.75	25.53	25.25
Clover	ORmintSTD.txt	16-04	0.075	0.084	1	NA	Air	2.34	2.33	2.31
							Ground	0.73	0.73	0.72
Asparagus	MIasparagusSTDv2.txt	01-09	0.10	0.11	2	10	Air	9.34	9.30	9.24
							Ground	5.19	5.16	5.12
Sweet Corn	MScornSTD.txt	10-04	0.10	0.11	2f	14f	Air	30.46	30.31	30.06
							Ground	28.57	28.44	28.21
			0.054	0.061	4f	7f	Air	29.40	29.18	28.89
							Ground	27.26	27.05	26.77
Pome Fruit (within Crop Group 11-10)	CAfruit_WirrigSTD.txt	16-01	0.15	0.17	4	12	Air	17.49	17.40	17.24
	NCappleSTD.txt	01-06					Air	38.98	38.76	38.43
	PAappleSTD_V2.txt	01-07					Air	42.16	41.97	41.78
	OrappleSTD.txt	01-10					Air	49.07	48.94	48.22
							Airblast	38.80	38.59	38.38
							Ground	38.97	33.80	33.62
Soybean	MSsoybeanSTD.txt	16-04	0.04	0.045, 0.042	2	7	Aerial	6.67	6.60	6.53
							Ground	5.99	5.93	5.87

Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate		#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L)		
			lbs. ai/A	kg ai/ha				peak	21-day	60-day
Bait	PAturfSTD.txt	01-06	0.082	0.092	24e	3e	Ground	51.56	51.33	50.93
Bait					1e	NA	Ground	2.06	2.05	2.05
Granular Application	PAturfSTD.txt	01-06	0.030	0.034	1	NA	Ground	0.76	0.76	0.76
			0.040	0.045	1	NA	Ground	1.01	1.00	1.00
			0.050	0.056	1	NA	Ground	1.25	1.25	1.24
Aerial Application, Flowable	FlcucumberSTD.txt	01-09	0.010	0.011	2	7	Aerial	2.85	2.82	2.79
			0.020	0.022	2	7	Aerial	Not Determined		
			0.0025	0.0028	2	7	Aerial	0.73	0.72	0.71
			0.005	0.0056	2	7	Aerial	1.45	1.44	1.42

Abbreviations: NA=not applicable. App.= Application
Bold values are the highest EECs for that Tier of modeling. Values without a designation represent EECs for parent, IM-1-4, and unextracted residues.
a. Represents EECs for parent and IM-1-4.
b. Represents EECs for parent alone.
c. Assumed for GENEEC.
d. Value assumed because the application rate and maximum number of applications do not combine to give the maximum seasonal application rate.
e. Assumed
f. Label allows for different combinations of number of applications and application intervals. The scenarios models add up to seasonal application rates of 0.20 lbs ai/A while 0.21 lbs ai/A are allowed on the label.
g. Represents EECs for parent and unextracted residues.


Soybean, Aerial, Parent, IM-1-4, and Unextracted Residues
Concentration of Residues (µg/L)
10
8
6
4
2
0
0
2000
4000
6000
8000
10000
12000
Number of Days


Soybean, Aerial, Parent and IM-1-4
Concentration of Residues (µg/L)
5
4
3
2
1
0
0
2000
4000
6000
8000
10000
12000
Number of Days


Soybean, Aerial, Parent Residues
Concentration of Residues (µg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
2000
4000
6000
8000
10000
12000
Number of Days

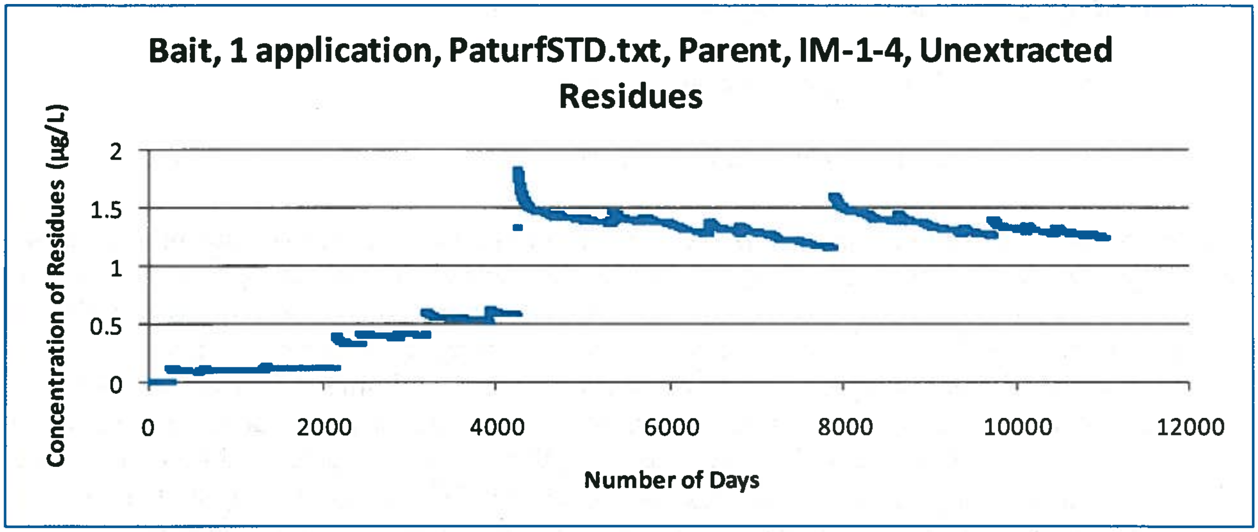


Figure 3-1. PRZM/EXAMs EECs over time for various use patterns and residues

3.2.B. Estimated Concentration in Groundwater

SCI-GROW was used to estimate the groundwater concentration of the combined parent, IM-1-4 degradate, and unextracted residues to assess risk when groundwater might be used for irrigation purposes. For acetamiprid, the SCI-GROW run was with the median K_{oc} (251 mL/g_{oc}) and a median aerobic soil metabolism half-life (78 days[15]) that included acetamiprid, IM-1-4, and unextracted residues. Ground water concentrations were estimated for representative high use scenarios (tree nut and multiple bait application) and low use scenarios (soybean and single bait applications). Estimated ground water concentrations range from 0.01 to 0.73 µg/L.

Table 3-10. Ground Water Concentrations for Acetamiprid, IM-1-4, and Unextracted Residues (µg/L) (Estimated Using SCI-GROW)

Scenario	Single Application Rate (lbs ai/A)	Number of Applications	Concentration of Acetamiprid, IM-1-4, and Unextracted Residues in Ground Water in µg/L
Tree Nut	0.20	4	0.30
Soybean	0.04	2	0.03
Bait	0.04	1	0.01
Bait	0.082	24	0.73

[15] The corresponding model input value for PRZM/EXAMs is the 90th percentile on the mean value of 381 days. This value is much higher than the median value of 78 days.

3.1. Measures of Terrestrial Exposure

3.1.A. Terrestrial Animals

3.1.A.i. Proposed Crop Uses

The proposed application of acetamiprid to crops listed in Table 3-11 has the potential to reach non-target terrestrial animals via direct application and spray drift. For the terrestrial portion of the assessment, only proposed uses are evaluated because there are no new data that would change risk conclusions for previously assessed uses.[16] Terrestrial EECs for flowable formulations are derived using maximum application rates and minimum intervals between applications. The program T-REX (v 1.4.1) is used to calculate dietary and dose-based EECs of acetamiprid for mammals and birds on the site of application by estimating residues on foliage, insects, and seeds using methods of Hoerger and Kenaga (1972) as modified by Fletcher *et al.* (1994). Given that no data on interception and subsequent dissipation from foliar surfaces are available for acetamiprid, a default foliar dissipation half-life of 35 days is used, which is based on the work of Willis and McDowell (1987).

Upper-bound Kenaga nomogram values are used to derive the terrestrial EECs for risk estimation. A one-year time period is simulated. Consideration is given to different types of feeding strategies for mammals and birds, including herbivores, insectivores and granivores. For dose-based exposures, three weight classes of mammals (15, 35, and 1000 g) and birds (20, 100, and 1000 g) are considered. An example output from the T-REX model is provided in Appendix C and EECs are shown in Table 3-11 to 3-14. Uncertainties in the terrestrial EECs are primarily associated with a lack of data on interception and subsequent dissipation from foliar surfaces.

Table 3-11. Avian dose-based EECs (mg/kg-bw) of acetamiprid on food residues following application to various crops.

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	EEC[a] (mg/kg-bw) Weight Classes (g)		
			20	100	1000
Leafy Cole Crops and Turnip Greens	0.1 (4/7)	Short Grass	89.9	51.3	23.0
		Tall Grass	41.2	23.5	10.5
		Broadleaf Plants, Small insects	50.6	28.8	12.9
		Fruits, Pods, Seeds, Large Insects	5.6	3.2	1.4
		Granivores	1.3	0.7	0.3
Fruiting Vegetables	0.075 (4/7)	Short Grass	67.4	38.4	17.2
		Tall Grass	30.9	17.6	7.9
		Broadleaf Plants, Small insects	37.9	21.6	9.7
		Fruits, Pods, Seeds, Large Insects	4.2	2.4	1.1

[16] Passerine data were submitted since the previous risk assessments and considered in the memo attached to the passerine DER review (DP Barcode: D388026).

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	EEC[a] (mg/kg-bw) Weight Classes (g)		
			20	100	1000
		Granivores	0.9	0.5	0.2
Citrus[b]	0.25[b] (2/7)	Short Grass	127.8	72.9	32.6
		Tall Grass	58.6	33.4	15.0
		Broadleaf Plants, Small insects	71.9	41.0	18.4
		Fruits, Pods, Seeds, Large Insects	8.0	4.6	2.0
		Granivores	1.8	1.0	0.5
	0.11 (5/7)	Short Grass	116.1	66.2	29.7
		Tall Grass	53.2	30.4	13.6
		Broadleaf Plants, Small insects	65.3	37.3	16.7
		Fruits, Pods, Seeds, Large Insects	7.3	4.1	1.9
		Granivores	1.6	0.9	0.4
Pome Fruit[b]	0.15 (4/12)	Short Grass	118.9	67.8	30.4
		Tall Grass	54.5	31.1	13.9
		Broadleaf Plants, Small insects	66.9	38.1	17.1
		Fruits, Pods, Seeds, Large Insects	7.4	4.2	1.9
		Granivores	1.7	0.9	0.4
Sweet Corn	0.054 (4/7)	Short Grass	48.5	27.7	12.4
		Tall Grass	22.2	12.7	5.7
		Broadleaf Plants, Small insects	27.3	15.6	7.0
		Fruits, Pods, Seeds, Large Insects	3.0	1.7	0.8
		Granivores	0.7	0.4	0.2
Asparagus	0.1 (2/10)	Short Grass	49.8	28.4	12.7
		Tall Grass	22.8	13.0	5.8
		Broadleaf Plants, Small insects	28.0	16.0	7.2
		Fruits, Pods, Seeds, Large Insects	3.1	1.8	0.8
		Granivores	0.7	0.4	0.2
Soybeans	0.04[b] (2/7)	Short Grass	20.5	11.7	5.2
		Tall Grass	9.4	5.4	2.4
		Broadleaf Plants, Small insects	11.5	6.6	2.9
		Fruits, Pods, Seeds, Large Insects	1.3	0.7	0.3
		Granivores	0.3	0.2	0.1

[a] Based on upper-bound Kenaga values.
[b] Previously assessed use but with new crops added to the label

Table 3-12. Avian and mammalian dietary-based EECs (mg/kg-diet) of acetamiprid on food residues following application to various crops.

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	EEC[a] (mg/kg-diet)
Leafy Cole Crops and Turnip Greens	0.1 (4/7)	Short Grass	78.9
		Tall Grass	36.2
		Broadleaf Plants, Small insects	44.4
		Fruits, Pods, Seeds, Large Insects	4.9
Fruiting Vegetables	0.075 (4/7)	Short Grass	59.2
		Tall Grass	27.1
		Broadleaf Plants, Small insects	33.3
		Fruits, Pods, Seeds, Large Insects	3.7
Citrus[b]	0.25[b] (2/7)	Short Grass	112.2
		Tall Grass	51.4
		Broadleaf Plants, Small insects	63.1
		Fruits, Pods, Seeds, Large Insects	7.0
	0.11 (5/7)	Short Grass	102.0
		Tall Grass	46.7
		Broadleaf Plants, Small insects	57.4
		Fruits, Pods, Seeds, Large Insects	6.4
Pome Fruit[b]	0.15 (4/12)	Short Grass	104.4
		Tall Grass	47.9
		Broadleaf Plants, Small insects	58.7
		Fruits, Pods, Seeds, Large Insects	6.5
Sweet Corn	0.054[b] (4/7)	Short Grass	42.6
		Tall Grass	19.5
		Broadleaf Plants, Small insects	24.0
		Fruits, Pods, Seeds, Large Insects	2.7
Asparagus	0.1 (2/10)	Short Grass	43.7
		Tall Grass	20.0
		Broadleaf Plants, Small insects	24.6
		Fruits, Pods, Seeds, Large Insects	2.7
Soybeans	0.04[b] (2/7)	Short Grass	18.0
		Tall Grass	8.2
		Broadleaf Plants, Small insects	10.1
		Fruits, Pods, Seeds, Large Insects	1.1

[a] Based on upper-bound Kenaga values.
[b] Previously assessed use but with new crops added to the label

Table 3-13. Mammalian Dose-based EECs (mg/kg-bw) of acetamiprid on food residues following application to various crops.

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	EEC* (mg/kg-bw) Weight Classes (g)		
			15	35	1000
Leafy Cole Crops and Turnip Greens	0.1 (4/7)	Short Grass	75.2	52.0	12.1
		Tall Grass	34.5	23.8	5.5
		Broadleaf Plants, Small insects	42.3	29.3	6.8
		Fruits, Pods, Seeds, Large Insects	4.7	3.3	0.8
		Granivores	1.1	0.7	0.2
Fruiting Vegetables	0.075 (4/7)	Short Grass	56.4	39.0	9.0
		Tall Grass	25.9	17.9	4.1
		Broadleaf Plants, Small insects	31.7	21.9	5.1
		Fruits, Pods, Seeds, Large Insects	3.5	2.4	0.6
		Granivores	0.8	0.5	0.1
Citrus[a]	0.25[b] (2/7)	Short Grass	107.0	74.0	17.2
		Tall Grass	49.0	33.9	7.9
		Broadleaf Plants, Small insects	60.2	41.6	9.7
		Fruits, Pods, Seeds, Large Insects	6.7	4.6	1.1
		Granivores	1.5	1.0	0.2
	0.11 (5/7)	Short Grass	97.2	67.2	15.6
		Tall Grass	44.6	30.8	7.1
		Broadleaf Plants, Small insects	54.7	37.8	8.8
		Fruits, Pods, Seeds, Large Insects	6.1	4.2	1.0
		Granivores	1.4	0.9	0.2
Pome Fruit[a]	0.15 (4/12)	Short Grass	99.6	68.8	16.0
		Tall Grass	45.6	31.5	7.3
		Broadleaf Plants, Small insects	56.0	38.7	9.0
		Fruits, Pods, Seeds, Large Insects	6.2	4.3	1.0
		Granivores	1.4	1.0	0.2
Sweet Corn	0.054[b] (4/7)	Short Grass	40.6	28.1	6.5
		Tall Grass	18.6	12.9	3.0
		Broadleaf Plants, Small insects	22.9	15.8	3.7
		Fruits, Pods, Seeds, Large Insects	2.5	1.8	0.4
		Granivores	0.6	0.4	0.1
Asparagus	0.1 (2/10)	Short Grass	41.7	28.8	6.7
		Tall Grass	19.1	13.2	3.1
		Broadleaf Plants, Small insects	23.4	16.2	3.8
		Fruits, Pods, Seeds, Large Insects	2.6	1.8	0.4

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	EEC* (mg/kg-bw) Weight Classes (g)		
			15	35	1000
		Granivores	0.6	0.4	0.1
Soybeans	0.04[b] (2/7)	Short Grass	17.1	11.8	2.7
		Tall Grass	7.9	5.	1.3
		Broadleaf Plants, Small insects	9.6	6.7	1.5
		Fruits, Pods, Seeds, Large Insects	1.1	0.7	0.2
		Granivores	0.2	0.2	<0.1

*Based on upper-bound Kenaga values.
[a] Previously assessed use but with new crops added to the label
[b] Seasonal rate modeled differs from proposed label rate, but was modified to fit input specifications for T-REX

3.1.A.ii. Proposed Bait Uses

EFED's terrestrial exposure assessment for bait applications differs from applications of flowable pesticides since the bait itself is the potential food item of concern and residues are not expected to be deposited on plant, insect, or seed surfaces. For this assessment, direct consumption of bait (primary consumption) is the major potential route of exposure for terrestrial animals. It is also possible that animals may consume other animals that were previously contaminated through bait consumption (secondary consumption), but this type of secondary exposure is not considered in this screening-level assessment and is assumed to be lower than for primary consumption.

Exposure through bait consumption is calculated using two different methodologies. In the first method, a total amount of acetamiprid consumed per day is calculated for different body weight classes of birds and mammals by assuming that the entire diet is the treated bait. Acetamiprid exposure is calculated as mg ai/kg-bw, where kg-bw is kilograms of the consuming individual for three standard weight classes of passerines and rodents. Exposure (food dry weight consumption) estimates were derived using allometric equations from USEPA Wildlife Exposure Handbook (1993). The allometric equations for passeriform birds and rodent mammals were used as these would best approximate those individuals with high potential for consuming bait and they would give the most conservative exposure estimates. Food dry weight was converted to wet weight using the conservative assumption that bait contains 10% water, similar to the assumption that seeds for wildlife consumption contain 10% water (USEPA, 1993). Formulas for calculation of dose estimates are provided in Table 3-14, and acetamiprid exposure estimates (on a dose basis) are provided in Table 3-15. RQs are generated by dividing these exposure estimates of acetamiprid (mg ai/kg-bw) for a given weight class by the lowest toxicity endpoint for the relevant taxa adjusted for the default body weights. Acute RQs using these exposure estimates were generated for birds and mammals (using LD_{50} data) and chronic RQs were derived for mammals only (using NOAEL data), since the avian chronic endpoint value is based on a per kg-diet value rather than per kg-bw.

Table 3-14. Formulas for Calculation of Acetamiprid Intake based on Consumption of Bait (derived from USEPA Wildlife Exposure Handbook).

Passeriform bird food intake (g, dry weight): FI (g dry-wt/day) = 0.398 * Wt(g)0.850
Rodent mammal food intake (g, dry weight): FI (g dry-wt/day) = 0.621 * Wt(g)0.564
Food intake (g, wet weight): FI (g wet-wt/day) = FI (g dry-wt/day) / 0.90
Acetamiprid intake (mg ai/kg-bw/day) = FI (g wet-wt/day) * 5000 mg ai/kg-bait[a] / Wt(g)
Where: Wt(g) = weight (in grams) of the bird or mammal consumer and FI = food intake

[a] 5,000 mg ai/kg-bait value based on multiplying percentage of acetamiprid in bait (0.5%) by 1 kg bait

Table 3-15. Expected Acetamiprid intake for default bird and mammal weights, assuming 100% of diet is the bait.

	Weight (g)	Food intake (g dry-wt/day)	Food intake (g wet-wt/day)	Acetamiprid intake (mg ai/kg-bw/day)
Passeriform Birds*	20	5.1	5.6	1410.8
	100	19.9	22.2	1108.2
	1000	141.2	156.9	784.5
Rodent Mammals	15	2.9	3.2	1059.4
	35	4.6	5.1	732.2
	1000	30.6	34.0	169.8

* Surrogate for reptiles and terrestrial-phase amphibians

The second exposure method involves calculating the ratio between the amount of bait distributed over a one square foot (ft^2) area and the experimental LD_{50} for the group of organisms. This is referred to as the LD_{50} ft^{-2} method. Conceptually, the LD_{50} ft^{-2} is the amount of pesticide estimated to kill 50% of exposed animals in each square foot of applied area. In the case of fly scatter bait, the LD_{50} ft^{-2} calculation is based on T-REX settings for a granular formulation with broadcast application, since fly bait appears to be a granular pellet that is meant to be distributed over a given surface area. Since the label states that scatter bait should be reapplied as needed, additional calculations were performed to estimate the specific application rate thresholds that would lead to exceedance of Agency LOCs (Section 4.2.B.ii).

3.1.B. Terrestrial Plants

Exposure to upland and wetland plants is estimated using the TERRPLANT (Version 1.2.2)[17] screening model (Table 3-16). TERRPLANT estimates potential exposure from a single application using default assumptions for runoff and spray drift. For runoff plus drift, TERRPLANT incorporates two similar conceptual models for depicting dry and semi-aquatic areas of terrestrial habitats. For both models, a non-target area is adjacent to the treated field. Pesticide exposures to plants adjacent to a treated field are estimated due to runoff and spray drift. For a dry area adjacent to the treated field, runoff exposure is estimated as sheet runoff. In the model, sheet runoff is defined as the amount of pesticide in water that runs off of the soil surface of a treated field which is equal in size to the non-target area (1:1 ratio of areas). For

[17] http://www.epa.gov/oppefed1/models/terrestrial/terrplant/terrplant_user_guide.html#references

semi-aquatic areas, runoff exposure is estimated as channelized runoff. In the model, channelized runoff is the amount of pesticide that runs off of a treated field 10 times the size of the area adjacent to the treated field (10:1 ratio of areas). The drift component is calculated as 1% of applied mass for ground spray or 5% of applied mass for aerial spray, and 0% for bait applications. Estimated exposures through runoff plus drift (loading) and drift alone are then compared to measures of plant survival and growth (*e.g.*, effects to seedling emergence and vegetative vigor) to develop RQ values. Applications of flowable materials, as with acetamiprid uses on agricultural crops, involve exposure of non-target plants to both spray drift and runoff. Applications of dry or granular materials, as with the bait use, involve only exposure to runoff.

Table 3-16. Estimated EECs (lbs ai/A) derived from the TERRPLANT screening model for application to various crops.

Use	Application Rate (lbs ai/A)	Application Method	Total Loading to Adjacent Areas[a]	Total Loading to Semi-aquatic Areas	Drift EEC
Leafy Cole Crops and Turnip Greens; Sweet Corn; Asparagus	0.1	Aerial Spray	0.01	0.06	0.005
		Ground Spray	0.006	0.05	0.001
Fruiting Vegetables	0.075	Aerial Spray	0.008	0.04	0.004
		Ground Spray	0.005	0.04	0.0008
Citrus[b]	0.25	Aerial Spray	0.03	0.1	0.01
		Ground Spray	0.02	0.1	0.003
Pome Fruit[b]	0.15	Aerial Spray	0.02	0.08	0.008
		Ground Spray	0.009	0.08	0.002
Soybeans	0.04	Aerial Spray	0.004	0.02	0.002
		Ground Spray	0.002	0.02	0.0004
Bait	0.082	Ground scatter	0.004	0.04	0

[a] Loading is runoff plus drift, except for bait
[b] Previously assessed use but with new crops added to the label

3.2. Ecological Effects Characterization

All toxicity studies were conducted with the parent compound, acetamiprid, or its degradates, with the exception of the terrestrial plant studies, which were conducted with a different formulated product than the ones being assessed here. As described in the Agency's Overview Document (USEPA, 2004), the most sensitive endpoint for each taxon is used for risk estimation. The data used in this assessment are summarized in Tables 3-17 to 3-27. In general, only the most sensitive species and endpoint for different organismal groups are presented in the tables, exept where otherwise noted. Additional discussion of the ecological effects of acetamiprid can be found in the EFED new chemical review for acetamiprid (DP Barcode D270386) as well as a recent new use ecological risk assessment conducted in 2009 (DP Barcode D364328). The endpoints used in the current assessment closely match those used in the 2009 assessment, with the exception of a recent acute oral toxicity study on passerine birds (MRID 48407701) that was submitted in 2011. Several non-guideline terrestrial plant studies were also reviewed since the latest risk assessment; results and interpretation of these studies are discussed in the Ecological Effects and Risk Description sections of this document.

In addition to the data submitted in support of registration and the information compiled through the Agency's pesticide review process, the ECOTOX database[18] was used to identify additional toxicity data from the open literature. ECOTOX is a source for locating single chemical toxicity data for aquatic life, terrestrial plants, and wildlife. It was created and is maintained by the US EPA, Office of Research and Development (ORD), and the National Health and Environmental Effects Research Laboratory's (NHEERL) Mid-Continent Ecology Division (MED). A review of open literature contained in an ECOTOX run performed on September 1, 2011 did not reveal any endpoints that are more sensitive than those from registrant-submitted studies. Two terrestrial insect studies from the open literature (Doerr *et al.*, 2004; Iwasa *et al.*, 2004) were considered and discussed in the 2009 ecological risk assessment as well as in the Ecological Effects and Risk Description sections of this document.

3.2.A. Aquatic Organisms

3.2.A.i. Fish and Aquatic-phase Amphibians

Two acute toxicity studies of the effect of acetamiprid on freshwater species were submitted. 96-hr LC_{50} values are greater than 100 and 119 mg ai/L for the rainbow trout (*Oncorhynchus mykiss*; MRID 44651864) and bluegill sunfish (*Lepomis macrochirus*; MRID 44651863), respectively (Table 3-17). Acetamiprid is therefore classified as practically non-toxic to freshwater fish on an acute exposure basis. However, sublethal effects were noted in both studies. In rainbow trout, darkened body pigmentation, swollen abdomen, and loss of equilibrium were reported at the three highest concentrations (50, 70, 100 mg ai/L). In bluegill sunfish, darkened body pigmentation was observed in all fish at all treatments (11.8, 20.0, 35.4, 65.0, 119.3 mg ai/L).

In the only acute estuarine/marine fish study involving acetamiprid, the 96-hr LC_{50} for sheepshead minnows (*Cyprinodon variegates*; MRID 44988411) is 100 mg ai/L, and lethargy was observed in all surviving fish at 90 mg ai/L. Acetamiprid is classified as slightly toxic to estuarine/marine fish on an acute exposure basis.

An acute toxicity study of the degradate IM-1-4 on rainbow trout (MRID 44651865) was conducted at concentrations ranging from 4.3 to 69.3 mg ai/L. No mortalities were reported except at the 69.3 mg ai/L test level, but this may have been due to buffering problems in the test solution, as pH levels ranged from 9.0-9.3. An additional concentration was subsequently tested under buffered conditions at 98.1 mg ai/L, and no mortality was observed. Sublethal effects, including darkened body pigmentation and surface swimming, were observed at concentrations

18 http://cfpub.epa.gov/ecotox/

above 4.3 mg ai/L. The 96-hr LC_{50} is >98.1 mg ai/L, classifying the degradate IM-1-4 as either slightly toxic or practically nontoxic to freshwater fish on an acute exposure basis.

Table 3-17. Most sensitive fish acute toxicity data for acetamiprid and degradate IM-1-4.

Species	Test Substance	96-hr LC_{50} (mg ai/L)	Toxicity Category	MRID	Study Classification
Rainbow trout (*Oncorhynchus mykiss*)	Technical acetamiprid	>100	Practically non-toxic	44651864	Acceptable
Sheepshead minnow (*Cyprinodon variegatus*)	Technical acetamiprid	100	Slightly toxic	44988411	Acceptable
Rainbow trout (*Oncorhynchus mykiss*)	94.5% IM-1-4 degradate	>98.1	Slightly toxic to practically non-toxic	44651865	Supplemental

A 35-day early life stage toxicity study (MRID 44651872) of fathead minnows (*Pimephales promelas*) was submitted to evaluate the chronic effects of acetamiprid on freshwater fish. The lowest observed adverse effect concentration (LOAEC) for the study is 38.4 mg ai/L based on both decreased survival and growth (measured by weight). The NOAEC is 19.2 mg ai/L (Table 3-18).

No chronic toxicity data were submitted for estuarine/marine fish. However, given the low acute toxicity to both freshwater and estuarine/marine fish and the lack of chronic risk to freshwater fish in previous assessments, these data may not be necessary.

Table 3-18. Most sensitive freshwater fish early life-stage toxicity data for acetamiprid.

Species	Test Substance	NOAEC (mg ai/L)	LOAEC (mg ai/L)	Endpoints Affected	MRID	Study Classification
Fathead minnow (*Pimphales promelas*)	Technical acetamiprid	19.2	38.4	Embryo and larval survival, larval growth (wet-weight and length)	44651872	Supplemental

3.2.A.ii. Aquatic Invertebrates

Table 3-19 contains a summary of acute toxicity data for acetamiprid and its degradates on both freshwater and estuarine/marine invertebrates. The non-biting midge (*Chironomus riparius*; MRID 45916201) is the most sensitive freshwater aquatic invertebrate species in which acetamiprid was tested. The 48-hr LC_{50} for the midge is 0.021 mg ai/L (21 μg ai/L), and acetamiprid is therefore considered very highly toxic to this species. Mortality was observed at all test concentrations except the lowest (0.006 mg ai/L). Acetamiprid is approximately three orders of magnitude more toxic to chironomids than to the freshwater cladoceran *Daphnia magna* (48-hr LC_{50} = 50 mg ai/L; MRID 44651866) on an acute exposure basis. Therefore, the chironomid endpoint value is used to represent freshwater invertebrates in this risk assessment.

Acetamiprid is also very highly toxic to mysid shrimp (*Americamysis bahia*; MRID 44651869), an estuarine/marine invertebrate, on an acute exposure basis. Mortality in this species was reported for all test concentrations except the lowest (0.013 µg ai/L), and the 48-hr LC_{50} is 0.066 mg ai/L (66 µg ai/L). The NOAEC is 0.013 mg ai/L based on lethargy.

Acute toxicity to aquatic invertebrates was evaluated for several degradates of acetamiprid, and detailed results are reported in the original Section 3 new chemical risk assessment (DP Barcode D270368) as well as in a recent new use assessment (DP Barcode D364328). Toxicity tests on *D. magna* with degradates IC-0 (MRID 44988409), IM-1-2 (MRID 44651867), and IM-1-4 (MRID 44651868) resulted in 48-hr LC_{50} values of >95.1, >99.8, and 43.9 mg ai/L, respectively, while the *D. magna* 48-hr LC_{50} for the parent compound is 50 mg ai/L (MRID 44651866). This indicates that IM-1-4 has similar toxicity to the parent for freshwater aquatic invertebrates. The 48-hr LC_{50} of IM-1-5 for the non-biting midge (MRID 46255610) is 68 mg ai/L as compared to 0.021 mg ai/L for the parent, acetamiprid.

For estuarine/marine invertebrates, the only acute toxicity tests with a degradate was with IM-1-4 on mysid shrimp (MRID 44651870), resulting in an LC_{50} of 19 mg ai/L compared to the parent compound endpoint value of 0.066 mg ai/L for the same species.

In general, results suggest that degradation products of acetamiprid have low toxicity to aquatic invertebrates, although the similar toxicity of IM-1-4 to *D. magna* relative to the parent compound suggests that some uncertainty may still exist. Given this uncertainty, a total toxic reside approach is taken in this assessment for aquatic organisms, where combined exposure values for parent and IM-1-4 degradate are compared to study endpoints for the purpose of estimating risk. The influence of assuming exposure from parent and IM-1-4 versus parent alone on risk is considered further in the Risk Description portion of this document.

Table 3-19. Most sensitive aquatic invertebrate acute toxicity data for acetamiprid and degradates.

Species	Test Substance	48-hr LC_{50} (mg ai/L)	Toxicity Category	MRID	Study Classification
Non-biting Midge (*Chironomus riparius*)	Technical acetamiprid	0.021	Very highly toxic	45916201	Supplemental
Mysid (*Americamysis bahia*)	Technical acetamiprid	0.066	Very highly toxic	44651869	Acceptable
Water flea (*Daphnia magna*)	99.7% IC-0 degradate	>95.1	Practically non-toxic	44988409	Acceptable
Water flea (*Daphnia magna*)	99.6% IM-1-2 degradate	>99.8	Practically non-toxic	44651867	Acceptable
Water flea (*Daphnia magna*)	98.7% IM-1-4 degradate	43.9	Slightly toxic	44651868	Acceptable
Mysid (*Americamysis bahia*)	99.6% IM-1-4	19	Slightly toxic	44651870	Acceptable
Non-biting Midge (*Chironomus riparius*)	98.9% IM-1-5 degradate	68	Slightly toxic	46255610	Acceptable

Chronic toxicity data for acetamiprid is available for *D. magna* (MRID 44651871). Survival was reduced in this species by 57%, compared to controls, at the highest test concentration (74 mg ai/L). Significant reductions in length (8%), weight (24%), and mean number of offspring (50%) were observed at 9 mg ai/L, resulting in a NOAEC of 5 mg ai/L based on reduced growth and reproduction (Table 3-20). However, since acetamiprid is approximately three orders of magnitude more toxic to chironomids (LC_{50} = 0.021 mg ai/L) than to daphnids (LC_{50} = 50 mg ai/L) on an acute exposure basis, the available chronic endpoint for *D. magna* may not adequately represent chronic toxicity to more sensitive freshwater invertebrates. Therefore, an acute-to-chronic ratio (ACR) approach is used for this assessment. Since the acute daphnid endpoint is 50 mg ai/L and the chronic endpoint is 5 mg ai/L, the ACR is for this species is 10. Applying the ACR to the chironomid acute toxicity endpoint results in an estimated chronic endpoint of 0.0021 mg ai/L. This value is used to calculate risk quotients for freshwater invertebrates.

A chronic study with acetamiprid (MRID 44651873) was also carried out on mysid shrimp as a representative of estuarine/marine invertebrates. In this test, a statistically significant difference in survival was only detected at the highest concentration (0.020 μg ai/L) (Table 3-20). Reduction in male dry body weight was the most sensitive endpoint, yielding a NOAEC of 2.5 μg ai/L and a LOAEC of 4.7 μg ai/L. The percent reduction in male dry weight ranged from 11 to 36% in test levels that significantly differed from the dilution control.

A single chronic toxicity study with acetamiprid degradates was carried out with the IM-1-5 degradation product in *D. magna* (MRID 44651871) (Table 3-20). Significant reduction in mean number of offspring (30%) was observed at 50 mg ai/L, the LOAEC, resulting in a NOAEC of 25 mg ai/L based on impaired reproduction.

Table 3-20. Most sensitive aquatic invertebrate chronic toxicity data for acetamiprid and degradates.

Species	Test Substance	NOAEC (mg ai/L)	LOAEC (mg ai/L)	Endpoints Affected	MRID	Study Classification
Water flea *(Daphnia magna)*	Technical acetamiprid	5.0[a]	9.0	Reduced offspring production	44651871	Acceptable
Midge (*Chironomus riparius*)	Acute to chronic ratio	0.0021[b]	--	Calculated value	--	--
Mysid *(Americamysis bahia)*	Technical acetamiprid	0.0025	0.0047	Reduced body weight in males	44651873	Acceptable
Water flea *(Daphnia magna)*	98.9% IM-1-5 degradate	25	50	Number of young per female	46255609	Supplemental

[a] Endpoint not used for risk estimation due to lower ACR value
[b] Endpoint was estimated using the ACR of 10 calculated for D. magna and applying it to the Midge acute 48-hr LC50 of 21 µg ai/L. This value was used to calculate risk quotients.

3.2.A.iii. Aquatic Plants

Tier 1 toxicity testing with aquatic plants indicates that acetamiprid is not toxic at the concentrations tested. Exposure to acetamiprid did not significantly affect growth in one aquatic vascular plant species (*Lemna gibba*, 14-day test) and four nonvascular plants species tests at limit concentrations ranging from 1.0 - 1.3 mg ai/L. See the original Section 3 document for details of these studies. The endpoints used in risk assessment are listed in Table 3-21.

Table 3-21. Most sensitive aquatic plant toxicity data for acetamiprid.

Species	Test substance	NOAEC (mg ai/L)	EC_{50} in mg ai/L (length of study)_	MRID	Study Classification
			Aquatic Vascular Plants		
Duckweed (*Lemna gibba*)	Technical acetamiprid	1.0	>1.0 (14-day)	44988415	Acceptable
			Aquatic Non-vascular Plants		
Freshwater diatom (*Navicula pelliculosa*)	Technical acetamiprid	1.1	>1.1 (5-day)	44988417	Acceptable
Marine diatom (*Skeletonema costatum*)	Technical acetamiprid	1.0	>1.0 (5-day)	44988418	Acceptable

3.2.B. Terrestrial Organisms

3.2.B.i. Birds

Acute oral toxicity studies have been submitted for two avian species: the zebra finch (*Taeniopygia guttata*; MRID 48407701) and the mallard duck (*Anas platyrhynchos*; MRID 44651859). The former study was submitted after the most recent new use risk assessment in order to represent toxicity to passerine birds. Acetamiprid is very highly toxic to zebra finches with a 14-day acute oral LD_{50} of 5.68 mg ai/kg-bw (Table 3-22) and moderately toxic to mallards with an acute oral LD_{50} of 84.4 mg ai/kg-bw. Zebra finches are the most sensitive species for the acute oral toxicity and their endpoint was used to calculate risk quotients. In both studies, at least one sublethal effect (*e.g.*, ruffled appearance, lethargy, loss of coordination) was observed at all doses.

Table 3-22. Most sensitive avian acute oral toxicity data for acetamiprid.

Species	Test substance	14-Day LD_{50} (mg ai/kg-bw)	Toxicity Category	MRID	Study Classification
Zebra finch (*Taeniopygia guttata*)	Technical acetamiprid	5.68	Very highly toxic	48407701	Acceptable

Subacute dietary toxicity studies were performed on both the mallard duck (MRID 44651861) and the northern bobwhite quail (*Colinus virginianus*; MRID 44651860) (Table 3-23). The 5-day dietary LC_{50} reported in both of these studies was >5000 mg ai/kg-diet since less than 50% mortality was observed at all concentrations tested. Both studies reported mortalities and sublethal effects at one or more test levels. The lowest concentration where no effects were observed was 200 mg ai/kg-diet in the mallard study based on reduced survival, behavioral effects, and decreased food consumption and 1000 mg ai/kg-bw in the quail study based on reduced survival and decreased food consumption.

The only available acute or subacute avian study on an acetamiprid degradate is a dietary study of the compound IM-1-4 with the mallard duck (MRID 44651862). The 5-day dietary LC_{50} of this study was >5000 mg ai/kg-diet, suggesting that IM-1-4 is similarly non-toxic to mallards compared to the parent compound on a dietary exposure basis. No mortalities were observed at any concentration in this study.

Table 3-23. Subacute dietary toxicity of acetamiprid to birds.

Species	Test substance	5-day LC_{50} (mg ai/kg-diet)	Toxicity Category	MRID	Study Classification
Mallard duck (*Anas platyrhynchos*)	Technical acetamiprid	>5000	Practically non-toxic	44651861	Supplemental
Bobwhite quail (*Colinus virginianus*)	Technical acetamiprid	>5000	Practically non-toxic	44651860	Supplemental
Mallard duck (*Anas platyrhynchos*)	IM-1-4 degradate	>5000	Practically non-toxic	44651862	Acceptable

Chronic toxicity to birds was initially evaluated in the form of two reproduction studies submitted for the mallard (MRID 44988408) and northern bobwhite quail (MRID 44988407). However, there were uncertainties regarding major endpoints in both studies resulting in submission of two new one-generation studies in the same two species (MRIDs 46369204, 46555601). In the more recent mallard study, reduced male body weight was the most sensitive endpoint and was observed at all treatment levels (treatment range: 60.2 to 461 mg ai/kg-diet) (Table 3-24). In the more recent bobwhite quail study, the most sensitive endpoint was hatchling body weight, which was observed at all test concentrations except the lowest, resulting in NOAEC and LOAEC values of 89.7 and 184 mg ai/kg-diet, respectively. Since the mallard duck showed higher sensitivity than the bobwhite quail but yielded a non-definitive endpoint, chronic risk quotients are not calculated for birds in the Risk Estimation section (Section 4.1); instead, chronic avian risk issues are evaluated qualitatively in the Risk Description (Section 4.2).

Table 3-24. Most sensitive avian chronic toxicity data for acetamiprid.

Species	Test Substance	NOAEC (mg ai/kg-diet)	LOAEC (mg ai/kg-diet)	Endpoints Affected	MRID	Study Classification
Mallard duck (*Anas platyrhynchos*)	Technical acetamiprid	<60.2	60.2	Growth (body weight; weight gain; food consumption)	46369201	Acceptable

3.2.B.ii. Mammals

From the available data, acetamiprid is classified as moderately toxic to mammals on an acute oral exposure basis (LD_{50} = 146 mg ai/kg-bw). Acute oral toxicity tests were also conducted on several metabolites and degradation products of acetamiprid. Results of these tests show that these compounds are considerably less toxic than the parent compound, and are classified as slightly toxic or practically nontoxic to mammals (Table 3-25).

Table 3-25. Acute toxicity of acetamiprid and degradates to mammals.

Species	Test substance	Acute Oral LD_{50} (mg ai/kg-bw)	Toxicity Category	MRID	Study Classification
Black rat (*Rattus rattus*)	Technical acetamiprid	146	Moderately toxic	44651833	Acceptable
Black rat (*Rattus rattus*)	IM-0 degradate	1792	Practically nontoxic	44988421	Acceptable
Black rat (*Rattus rattus*)	IC-0 degradate	>5000	Practically nontoxic	44988420	Acceptable
Black rat (*Rattus rattus*)	99.9% IM-2-2 Degradate	2176	Practically nontoxic	44988422	Acceptable
Black rat (*Rattus rattus*)	99.6% IM-1-2 degradate	>5000	Practically nontoxic	44651835	Acceptable
Black rat (*Rattus rattus*)	99.6% IM-1-4 degradate	1088	Slightly toxic	44651834	Acceptable

Consistent results were reported for two chronic studies and a 13-week subchronic study of acetamiprid in Norwegian rats (*Rattus norvegicus*) (Table 3-26). Reduction in growth, as measured by body weight, weight gain, and food consumption, was observed at test concentrations of 400-800 mg ai/kg-diet and greater, whereas test concentrations of 160-280 mg ai/kg-diet caused no significant effects. In addition to growth endpoints, reproductive effects were also observed at 280 mg ai/kg-diet in a two-generation study (MRID 44988430). The NOAEC (160 mg/kg diet) used for this assessment is based on the growth endpoints from the 2-year chronic feeding study (MRID 44988429).

Table 3-26. Chronic toxicity of acetamiprid to mammals.

Species	Study Type	Test Substance	NOAEC (mg ai/kg-diet)	LOAEC (mg ai/kg-diet)	Endpoints Affected	MRID
Brown Rat (*Rattus norvegicus*)	Subchronic dietary (13 week)	Technical acetamiprid	200	800	Body weight gain, food consumption	44651843
Brown Rat (*Rattus norvegicus*)	Chronic feeding (24 months)	Technical acetamiprid	160*[1]	400	Growth (female body weight; female weight gain)	44988429

Species	Study Type	Test Substance	NOAEC (mg ai/kg-diet)	LOAEC (mg ai/kg-diet)	Endpoints Affected	MRID
Brown Rat (*Rattus norvegicus*)	Two-generation reproduction	Technical acetamiprid	280	800	Parental: body weight, weight gain, food consumption; Offspring: pup weight, litter size viability and weaning indices, age to maturation	44988430

* Endpoint value used for risk estimation
[1] NOAEL based on daily dietary intake is 7.1 mg ai/kg-bw/day

3.2.B.iii. Terrestrial Invertebrates

An acute contact toxicity test was conducted on young adult European honeybees (*Apis mellifera*, MRID 44651874). In this study, percent mortality was 40, 66.7, 46.7, 63.3, and 60% for the 6.25, 12.5, 25, 50, and 100 µg ai/bee test groups, respectively. The LC_{50} for the contact study was reported as 8.1 µg/bee. However, there is uncertainty in this LC_{50} value since no clear dose-response relationship was apparent. Since percent mortality was 66.7% at 12.5 µg ai/bee, the median mortality concentration is considered to be below this value (*i.e.*, <12.5) suggesting that acetamiprid should be considered moderately toxic to honeybees on an acute contact exposure basis (Atkins *et al.*, 1976). In the ECOTOX database, Iwasa *et al.* (2004) report an acute contact 24-hr LC_{50} of 7.07 µg ai/bee. Although this endpoint was based on nominal concentrations and the exposure period was half that of a typical guideline acute contact study (*i.e.*, 48 hrs), it does generally support the registrant-submitted study finding that acetamiprid is moderately toxic to honeybees on a contact exposure basis.

An acute oral study was also carried out in honeybees (MRID 44651874), as well as oral and contact studies in bumble bees (*Bombus terrestris*; MRID 45932503), but endpoint values were greater than the endpoint observed in the guideline honeybee acute contact toxicity study. Details of these studies are described in the original new chemical assessment for acetamiprid (DP Barcode D270386) and a recent new use assessment (DP Barcode D364328).

EPA currently relies on a tiered approach for evaluating the potential effects of pesticides on honeybees. If an acute contact toxicity test (Tier 1) results in a 48-hr LC_{50} value less than 11 µg ai/bee, then honeybee toxicity of residues on foliage studies (Guideline 850.3030)[19] can be required (Tier 2). However, if the 48-hr LC_{50} is less than 11 µg ai/bee and there are data

[19] USEPA. 1996. Ecological Effects Test Guidelines. OPPTS 850.3030. Honeybee Toxicity of Residues on Foliage. EPA 712–C–96–148. April 1996. http://www.epa.gov/ocspp/pubs/frs/publications/OPPTS_Harmonized/850_Ecological_Effects_Test_Guidelines/Drafts/850-3030.pdf

indicating potential effects to honeybee colonies, then field testing of pollinators (Tier 3) may be requested consistent with (Guideline 850.3040)[20].

Since the reported 48-hr LC_{50} of the honeybee acute contact toxicity study was less than 11 µg/bee, a toxicity of residues on foliage study was submitted (MRID 44651875) but was deemed unacceptable due to low recovery of acetamiprid on treated foliage. Two semi-field studies conducted to evaluate the possible effect of acetamiprid on honeybee behavior were also submitted (MRIDs 45932504; 45932505). Both studies used tents to expose honeybees via contact with forage and/or overspray, and applications rates were equivalent to 0.15 and 0.09 lbs ai/A, which is in line with application rates for many registered and proposed crop uses. Mortality, flight frequency, and foraging behavior were evaluated relative to a control and a known toxic standard. No significant effects on any endpoints were observed in either study from acetamiprid treatments. Although acetamiprid is applied as a foliar spray and there is potential exposure to honeybees through contact with the insecticide, acetamiprid is intended as a systemic pesticide in plants and may be translocated and eventually expressed in pollen/nectar of treated plants. Since acetamiprid is also used as an ovicide (e.g., cotton), there is also uncertainty regarding the potential effects/sensitivity of larval bees.

3.2.B.iv. Terrestrial Plants

Seedling emergence and vegetative vigor studies (MRID 44988413) were conducted on ten plant species. Seedling emergence results were classified as supplemental because only shoot length, and not plant weight, was measured as an endpoint for growth. Based on shoot length, the most sensitive monocotyledonous (monocot) species was onion (*Allium cepa*; EC_{25} 0.23 lbs ai/A; NOAEC 0.077 lbs ai/A), and the most sensitive dicotyledonous (dicot) species was cucumber (*Cucumis sativus*; EC_{25} 0.16 lbs ai/A; NOAEC 0.077 lbs ai/A) (Table 3-27). The vegetative vigor study was classified as core (*i.e.*, acceptable) for all plants except for lettuce, which was classified as supplemental because adverse phytotoxic effects were observed in control plants. The most sensitive monocot and dicot species were ryegrass (*Lolium perenne*; EC_{25} 0.46 lbs ai/A; NOAEC 0.31 lbs ai/A) and lettuce (*Lactuca sativa*; EC_{25} 0.0087 lbs ai/A; NOAEC 0.0046 lbs ai/A), respectively. Since lettuce was particularly sensitive to acetamiprid but yielded only supplemental results, an additional vegetative vigor study was carried out on lettuce alone (MRID 45921401). The results of this study support the previous finding of greater phytotoxicity to lettuce (EC_{25} 0.0056 lbs ai/A; NOAEC 0.0025 lbs ai/A) compared to other plant species tested. Since lettuce serves as a surrogate for broadleaf monocots, potential toxicity to this larger group of plants is indicated. Two nonguideline studies were also carried out to more closely examine the phytotoxic effects of acetamiprid on lettuce. Both studies (MRIDs 46229601 and 46229602) reported that the variety of lettuce used in the first two studies, buttercrunch, accounted for the greater sensitivity of lettuce relative to other species tested, and other varieties of lettuce exhibited reduced sensitivities, narrowing the level of uncertainty to some degree.

[20] USEPA. 1996. Ecological Effects Test Guidelines. OPPTS 850.3040. Field Testing for Pollinators. EPA 712–C–96–150. April 1996. http://www.epa.gov/ocspp/pubs/frs/publications/OPPTS_Harmonized/850_Ecological_Effects_Test_Guidelines/Drafts/850-3040.pdf

Table 3-27. Toxicity of acetamiprid to terrestrial plants.

Species (Plant Group)	Test Substance	Study Type	EC_{25} (lbs ai/A)	NOAEC (lbs ai/A)	Endpoints Affected	MRID	Study Classification
Onion (monocot)	Wettable powder formulation (71.1% ai)	Seedling emergence	0.23	0.077	Shoot length	44988413	Supplemental
Cucumber (dicot)			0.16	0.077			
Perennial ryegrass (monocot)		Vegetative vigor	0.46	0.31	Plant weight		Acceptable
Lettuce (dicot)	Wettable powder formulation (70.04 % ai)		0.0056	0.0025	Shoot length	45921401	Supplemental

4. Risk Characterization

4.1. Risk Estimation

4.1.A. Aquatic Organisms

RQs for aquatic organisms are based on EECs calculated using PRZM/EXAMs. For bait application analyses, two scenarios were evaluated: a "low" application scenario, where the maximum allowable application amount is applied once per season, and a "high" application scenario, where the bait is applied 24 times per season at the same rate (0.082 lbs ai/A), with three days in between applications. Both of these scenarios are possible based on the label, which states that the bait may be reapplied as needed.

There are no acute risk LOC exceedances for estuarine/marine fish for any existing or proposed use of acetamiprid. The highest peak EEC for any use on the proposed label is 69 µg ai/L for the existing cucurbit use. Since the LC_{50} for estuarine/marine fish is 100,000 µg ai/L, the RQ value is less than 0.01, which is below the acute risk to listed and non-listed species LOCs of 0.05 and 0.5, respectively. For freshwater fish, all acute endpoints are non-definitive since less than 50 percent mortality was observed at all concentrations in tests with the parent and IM-1-4 degradate. Therefore, the potential for risk to freshwater fish is low. There are also no chronic LOC exceedances for freshwater fish for any existing or proposed use of acetamiprid. The highest 60-day EEC for any use on the proposed label is 67 µg/L for the existing cucurbit use. Since the NOAEC for freshwater fish is 19,200 µg ai/L, all chronic RQs are below the chronic risk LOC of 1.0.

For freshwater invertebrates, acute RQs range from 0.03 to 3.30 across all proposed or existing uses of acetamiprid (Table 4-1). The acute risk to listed species LOC of 0.05 is exceeded for all crop uses except for clover (an existing label use) when it is treated through ground spray. The acute risk to non-listed species LOC of 0.5 is exceeded for 17 of the 20 crop uses of acetamiprid, including five of the seven proposed new label uses (leafy cole crops, fruiting vegetables, citrus, sweet corn, pome fruit). For bait applications, both listed and non-listed acute risk LOCs are exceeded under the high application scenario (24 applications, 3-day intervals) while only the acute risk to listed species LOC is exceeded under the low application scenario (1 application per year).

Estuarine/marine invertebrate acute RQs range from 0.01 to 1.05 and exceed the acute risk to listed species LOC for all crop uses except for clover (Table 4-1). The acute risk to non-listed species LOC is exceeded for 10 of the 20 crops uses of acetamiprid, including 3 of the 7 proposed crop uses (leafy cole crops, citrus, pome fruit) for at least one application scenario (air, ground, airblast). For bait applications, both listed and non-listed acute risk LOCs are exceeded for estuarine/marine invertebrates under the high application scenario, but there were no acute risk LOC exceedances under the low application scenario.

Chronic RQs range from 0.35 to 32.61 for freshwater invertebrates and 0.29 to 27.40 for estuarine/marine invertebrates. The chronic risk LOC of 1.0 is exceeded for both freshwater and estuarine/marine invertebrates for all crop uses of acetamiprid except for clover, which is an existing use of acetamiprid (Table 4-1). For clover, the chronic risk LOC is only exceeded for freshwater invertebrates associated with aerial applications. For bait applications, the chronic risk LOC is exceeded for the high application scenario only.

Table 4-1. Aquatic invertebrate acute and chronic RQs based on exposure to acetamiprid (parent) + IM-1-4 degradate.

Use Scenario		App. Rate lbs ai/A (app/interv)	Peak EEC (µg/L)	Acute RQ[1]		21-Day EEC (µg/L)	Chronic RQ[2]	
				Fresh-water	Estuarine Marine		Fresh-water	Estuarine Marine
Cotton *NC Cotton*	Air	0.1 (4/7)	52.88	2.52[a]	0.80[a]	52.63	25.06	21.05
	Ground		47.90	2.28[a]	0.73[a]	47.71	22.72	19.08
Leafy Vegetables *CA Lettuce*	Air	0.075 (5/7)	47.62	2.27[a]	0.72[a]	47.37	22.56	18.95
	Ground		42.55	2.03[a]	0.64[a]	42.26	20.12	16.90
Leafy Cole Crops *CA Lettuce*	Air	0.1 (4/7)	50.48	2.40[a]	0.76[a]	50.23	23.92	20.09
	Ground		45.73	2.18[a]	0.69[a]	45.50	21.67	18.20
Fruiting Vegetables *FL Peppers*	Air	0.075 (4/7)	29.80	1.42[a]	0.45[b]	29.49	14.04	11.80
	Ground		27.01	1.29[a]	0.41[b]	26.72	12.72	10.69
Citrus[a] *FL Citrus*	Air	0.11 (5/7)	61.96	2.95[a]	0.94[a]	61.40	29.24	24.56
	Ground		57.31	2.73[a]	0.87[a]	56.80	27.05	22.72
	Airblast		60.76	2.89[a]	0.92[a]	60.22	28.68	24.09
Tuberous and Corm Vegetables *ME Potato*	Air	0.075 (4/7)	27.86	1.33[a]	0.42[b]	27.33	13.01	10.93
	Ground		21.52	1.02[a]	0.33[b]	21.43	10.20	8.57
Tobacco[a] *NC Tobacco*	Air	0.075 (4/7)	14.66	0.70[a]	0.22[b]	14.55	6.93	5.82
	Ground		10.11	0.48[b]	0.15[b]	10.04	4.78	4.02
Grapes and Other	Air	0.1	16.73	0.80[a]	0.25[b]	16.67	7.94	6.67

Use Scenario		App. Rate lbs ai/A (app/interv)	Peak EEC (µg/L)	Acute RQ[1]		21-Day EEC (µg/L)	Chronic RQ[2]	
				Fresh-water	Estuarine Marine		Fresh-water	Estuarine Marine
Climbing Small Fruits *NY Grapes*	Ground	(2/14)	12.91	0.61[a]	0.20[b]	12.88	6.13	5.15
	Airblast		15.06	0.72[a]	0.23[b]	15.00	7.14	6.00
Stone Fruit *MI Cherries*	Air	0.15 (4/10)	44.51	2.12[a]	0.67[a]	44.29	21.09	17.72
	Ground		31.23	1.49[a]	0.47[b]	31.16	14.84	12.46
	Airblast		38.39	1.83[a]	0.58[a]	38.25	18.21	15.30
Cucurbits *FL Cucumber*	Air	0.1 (5/5)	69.21	3.30[a]	1.05[a]	68.49	32.61	27.40
	Ground		65.51	3.12[a]	0.99[a]	64.83	30.87	25.93
Tree Nuts *GA Pecans*	Air	0.18 (4/14)	47.76	2.27[a]	0.72[a]	47.26	22.50	18.90
	Ground		38.87	1.85[a]	0.59[a]	38.39	18.28	15.36
	Airblast		44.03	2.10[a]	0.67[a]	43.55	20.74	17.42
Podded Legumes *MI Beans*	Air	0.1 (3/7)	43.83	2.09[a]	0.66[a]	43.72	20.82	17.49
	Ground		38.86	1.85[a]	0.59[a]	38.75	18.45	15.50
Strawberries and Other Low-Growing Berries *FL Strawberry*	Air	0.13 (2/7)	28.93	1.38[a]	0.44[b]	28.77	13.70	11.51
	Ground		26.36	1.26[a]	0.40[b]	26.22	12.49	10.49
Blueberries and Other Bush Berries *NY Grapes*	Air	0.085 (5/7)	36.75	1.75[a]	0.56[a]	36.64	17.45	14.66
	Ground		27.92	1.33[a]	0.42[b]	27.83	13.25	11.13
	Airblast		32.84	1.56[a]	0.50[a]	32.72	15.58	13.09
Onions and Other Bulb Vegetables *GA Onion*	Air	0.15 (4/7)	31.82	1.52[a]	0.48[b]	31.59	15.04	12.64
	Ground		25.75	1.23[a]	0.39[b]	25.53	12.16	10.21
Clover *OR Mint*	Air	0.075 (1/NA)	2.34	0.11[b]	0.04	2.33	1.11	0.93
	Ground		0.73	0.03	0.01	0.73	0.35	0.29
Asparagus *MI Asparagus*	Air	0.1 (2/10)	9.34	0.44[b]	0.14[b]	9.30	4.43	3.72
	Ground		5.19	0.25[b]	0.08[b]	5.16	2.46	2.06
Sweet Corn *MS Corn*	Air	0.1 (2/14)	30.46	1.45[a]	0.46[b]	30.31	14.43	12.12
	Ground		28.57	1.36[a]	0.43[b]	28.44	13.54	11.38
	Air	0.054 (4/7)	29.40	1.40[a]	0.45[b]	29.18	13.90	11.67
	Ground		27.26	1.30[a]	0.41[b]	27.05	12.88	10.82
Pome Fruit *OR Apple*	Air	0.15 (4/12)	49.07	2.34[a]	0.74[a]	48.94	23.30	19.58
	Ground		38.97	1.86[a]	0.59[a]	33.80	16.10	13.52
	Airblast		38.80	1.85[a]	0.59[a]	38.59	18.38	15.44
Soybean *MS Soybeans*	Air	0.04 (2/7)	6.67	0.32[b]	0.10[b]	6.60	3.14	2.64
	Ground		5.99	0.29[b]	0.09[b]	5.93	2.82	2.37

Use Scenario	App. Rate lbs ai/A (app/interv)	Peak EEC (µg/L)	Acute RQ[1]		21-Day EEC (µg/L)	Chronic RQ[2]	
			Fresh-water	Estuarine Marine		Fresh-water	Estuarine Marine
Bait (PA Turf: Low)	0.082 (1/NA)	2.06	0.10[b]	0.03	2.05	0.98	0.82
Bait (PA Turf: High)	0.082 (24/3)	51.56	2.46[a]	0.78[a]	51.33	24.44	20.53

[1] Chironomid (freshwater) and mysid (estuarine/marine) LC_{50} values are 21 and 66 µg ai/L, respectively
[2] Chironomid ACR-derived NOAEC 2.1 µg ai/L; mysid experimental NOAEC of 2.5 µg ai/L
[a] Exceeds acute risk to listed and non-listed species level of concern (RQ ≥ 0.5)
[b] Exceeds acute risk to listed species level of concern (RQ ≥ 0.05)

No-observed-effect values for vascular and non-vascular aquatic plants range from 1.0 to 1.1 mg ai/L and EC_{50} values are greater than 1.0 to 1.1 mg ai/L g ai/L. Since the highest peak EEC for any existing or proposed use of acetamiprid is approximately 69 µg ai/L (peak EEC), aquatic plant RQs are less than 0.1, and therefore at least one order of magnitude below the LOC of 1.

4.1.B. Terrestrial Animals

4.1.B.i. Proposed Crop Uses

For screening-level risk assessments, RQs for birds are based on the most sensitive dose-based and dietary-based acute toxicity endpoints, while only dose-based toxicity values are typically used for mammals (USEPA, 2004). Dose-based RQ values are typically higher than dietary-based RQ values since the former take into account the different energy requirements and levels of food consumption of different sized animals. If dietary-based RQ values were adjusted for differential food consumption, they would likely approach dose-based values.

Birds, Reptiles, and Terrestrial-Phase Amphibians

Acute RQs for birds were derived in T-REX for various size classes using weight-adjusted LD_{50} values based on the experimental LD_{50} (5.68 mg ai/kg-bw) and empirical weight (mean 12.1g) of birds from the zebra finch acute oral toxicity test (MRID 48407701), which is the most sensitive species tested. Acute avian dose-based RQ values for proposed crop applications range from 0.01 to 3.3 in soybeans, which is the proposed use with the lowest estimated exposure, and from 0.04 to 21 in citrus (2-application scenario) (Table 4-2), which is the proposed use with the highest estimated exposure. Even at the soybean application rate, which is less than half the value of any other proposed use, the risk to non-listed species LOC is exceeded for three of the five dietary categories, and the risk to listed species LOC is exceeded for four of the five food types. The RQ values for citrus are similar to those for tree nuts, which is the current acetamiprid label use with the highest estimated exposure values. An example output of avian acute dose-based RQs derived from the T-REX model is provided in Appendix C.

Table 4-2. Avian acute dose-based RQs from acetamiprid application to various crops.

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Acute Dose-based RQs (EEC/LD50[1]) Body Weight Classes (g)		
			20	100	1000
Leafy Cole Crops and Turnip Greens	0.1 (4/7)	Short Grass	15[a]	6.6[a]	2.1[a]
		Tall Grass	6.7[a]	3.0[a]	0.95[a]
		Broadleaf Plants, Small insects	8.3[a]	3.7[a]	1.2[a]
		Fruits, Pods, Seeds, Large Insects	0.92[a]	0.41[b]	0.13[b]
		Granivores	0.20[b]	0.09	0.03
Fruiting Vegetables	0.075 (4/7)	Short Grass	11[a]	4.9[a]	1.6[a]
		Tall Grass	5.0[a]	2.3[a]	0.72[a]
		Broadleaf Plants, Small insects	6.2[a]	2.8[a]	0.88[a]
		Fruits, Pods, Seeds, Large Insects	0.69[a]	0.31[b]	0.10[b]
		Granivores	0.15[b]	0.07	0.02
Citrus	0.25 (2/7)	Short Grass	21[a]	9.4[a]	3.0[a]
		Tall Grass	9.6[a]	4.3[a]	1.4[a]
		Broadleaf Plants, Small insects	12[a]	5.3[a]	1.7[a]
		Fruits, Pods, Seeds, Large Insects	1.3[a]	0.58[a]	0.19[b]
		Granivores	0.29[b]	0.13[b]	0.04
	0.11 (5/7)	Short Grass	19[a]	8.5[a]	2.7[a]
		Tall Grass	8.7[a]	3.9[a]	1.2[a]
		Broadleaf Plants, Small insects	11[a]	4.8[a]	1.5[a]
		Fruits, Pods, Seeds, Large Insects	1.2[a]	0.53[a]	0.17[b]
		Granivores	0.26[b]	0.12[b]	0.04
Pome Fruit	0.15 (4/12)	Short Grass	19[a]	8.7[a]	2.8[a]
		Tall Grass	8.9[a]	4.0[a]	1.3[a]
		Broadleaf Plants, Small insects	11[a]	4.9[a]	1.6[a]
		Fruits, Pods, Seeds, Large Insects	1.2[a]	0.54[a]	0.17[b]
		Granivores	0.27[b]	0.12[b]	0.04
Sweet Corn	0.054 (4/7)	Short Grass	7.9[a]	3.6[a]	1.1[a]
		Tall Grass	3.6[a]	1.6[a]	0.52[a]
		Broadleaf Plants, Small insects	4.5[a]	2.0[a]	0.63[a]
		Fruits, Pods, Seeds, Large Insects	0.50[a]	0.22[b]	0.07
		Granivores	0.11[b]	0.05	0.02
Asparagus	0.1 (2/10)	Short Grass	8.1[a]	3.6[a]	1.2[a]
		Tall Grass	3.7[a]	1.7[a]	0.53[a]
		Broadleaf Plants, Small insects	4.6[a]	2.1[a]	0.65[a]
		Fruits, Pods, Seeds, Large Insects	0.51[a]	0.23[b]	0.07

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Acute Dose-based RQs (EEC/LD50[1]) Body Weight Classes (g) 20	100	1000
		Granivores	0.11[b]	0.05	0.02
Soybeans	0.04 (2/7)	Short Grass	3.3[a]	1.5[a]	0.47[b]
		Tall Grass	1.5[a]	0.69[a]	0.22[b]
		Broadleaf Plants, Small insects	1.9[a]	0.84[a]	0.27[b]
		Fruits, Pods, Seeds, Large Insects	0.21[b]	0.09	0.03
		Granivores	0.05	0.02	0.01

[1] LD_{50} is adjusted by animal weight (20 g LD_{50} = 6.12 mg/kg-bw; 100 g LD_{50} = 7.80 mg/kg-bw; 1000 g LD_{50} = 11.01 mg/kg-bw)
[a] Exceeds acute risk to listed and non-listed species level of concern (RQ ≥ 0.5)
[b] Exceeds acute risk to listed species level of concern (RQ ≥ 0.1)

Avian dietary-based RQs were not calculated because both subacute dietary studies conducted in birds yielded non-definitive endpoints (>5,000 mg ai/kg-diet). If RQs were calculated based on the highest concentration tested in these studies (i.e., 5,000 mg ai/kg-diet), all values would be less than 0.01, indicating low risk. Since a definitive NOAEC was not derived for birds, chronic RQ values are also not presented in this section. RQs based on the LOAEC value of 60.2 mg ai/kg-diet would range from 0.02 to 1.9, resulting on some chronic LOC exceedances. Moreover, since the experimental NOAEC could be significantly lower, chronic risk to birds cannot be precluded for any proposed uses at this time. These results are further discussed further in the Risk Description section of the document.

Mammals

Acute and chronic mammalian RQs are listed in Table 4-3 and 4-4, respectively. Acute dose-based RQs range from <0.01 to 0.33 for proposed uses. None of the uses exceed the acute risk to non-listed species LOC, but all of the uses except for soybeans exceed the acute risk to listed species LOC for at least one dietary category. The chronic risk LOC is not exceeded for any of the proposed uses. The chronic mammalian endpoint (160 mg ai/kg-diet) used in this study was derived from a 24-month chronic feeding study (MRID 44988429). Past ecological assessments for other new uses of acetamiprid used the lowest endpoint value from a 2-generation study (280 mg ai/kg-diet; MRID 44988430) to derive chronic RQs. Use of the lower endpoint value does not result in chronic risk LOC exceedences for any of the existing label uses of acetamiprid as well as any of the proposed uses assessed in this document.

Table 4-3. Mammalian acute dose-based RQs from acetamiprid application to various crops.

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Acute Dose-based RQs (EEC/LD50[1]) Weight Classes (g) 15	35	1000

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Acute Dose-based RQs (EEC/LD_{50}[1]) Weight Classes (g) 15	35	1000
Leafy Cole Crops and Turnip Greens	0.1 (4/7)	Short Grass	0.23[b]	0.20[b]	0.11[b]
		Tall Grass	0.11[b]	0.09	0.05
		Broadleaf Plants, Small insects	0.13[b]	0.11[b]	0.06
		Fruits, Pods, Seeds, Large Insects	0.01	0.01	0.01
		Granivores	<0.01	<0.01	<0.01
Fruiting Vegetables	0.075 (4/7)	Short Grass	0.18[b]	0.15[b]	0.08
		Tall Grass	0.08	0.07	0.04
		Broadleaf Plants, Small insects	0.10[b]	0.08	0.05
		Fruits, Pods, Seeds, Large Insects	0.01	0.01	0.01
		Granivores	<0.01	<0.01	<0.01
Citrus	0.25 (2/7)	Short Grass	0.33[b]	0.28[b]	0.15[b]
		Tall Grass	0.15[b]	0.13[b]	0.07
		Broadleaf Plants, Small insects	0.19[b]	0.16[b]	0.09
		Fruits, Pods, Seeds, Large Insects	0.02	0.02	0.01
		Granivores	<0.01	<0.01	<0.01
	0.11 (5/7)	Short Grass	0.30[b]	0.26[b]	0.14[b]
		Tall Grass	0.14[b]	0.12[b]	0.06
		Broadleaf Plants, Small insects	0.17[b]	0.15[b]	0.08
		Fruits, Pods, Seeds, Large Insects	0.02	0.02	0.01
		Granivores	<0.01	<0.01	<0.01
Pome Fruit	0.15 (4/12)	Short Grass	0.31[b]	0.27[b]	0.14[b]
		Tall Grass	0.14[b]	0.12[b]	0.07
		Broadleaf Plants, Small insects	0.17[b]	0.15[b]	0.08
		Fruits, Pods, Seeds, Large Insects	0.02	0.02	0.01
		Granivores	<0.01	<0.01	<0.01
Sweet Corn	0.054 (4/7)	Short Grass	0.13[b]	0.11[b]	0.06
		Tall Grass	0.06	0.05	0.03
		Broadleaf Plants, Small insects	0.07	0.06	0.03
		Fruits, Pods, Seeds, Large Insects	0.01	0.01	<0.01
		Granivores	<0.01	<0.01	<0.01
Asparagus	0.1 (2/10)	Short Grass	0.13[b]	0.11[b]	0.06
		Tall Grass	0.06	0.05	0.03
		Broadleaf Plants, Small insects	0.07	0.06	0.03
		Fruits, Pods, Seeds, Large Insects	0.01	0.01	<0.01
		Granivores	<0.01	<0.01	<0.01

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Acute Dose-based RQs (EEC/LD50[1]) Weight Classes (g) 15	35	1000
Soybeans	0.04 (2/7)	Short Grass	0.05	0.05	0.02
		Tall Grass	0.02	0.02	0.01
		Broadleaf Plants, Small insects	0.03	0.03	0.01
		Fruits, Pods, Seeds, Large Insects	<0.01	<0.01	<0.01
		Granivores	<0.01	<0.01	<0.01

[1] LD_{50} is adjusted by animal weight (15 g LD_{50} = 320.88 mg/kg-bw; 35 g LD_{50} = 259.63 mg/kg-bw; 1000 g LD_{50} 112.30 mg/kg-bw)

[a] Exceeds acute risk to listed and non-listed species level of concern (RQ ≥ 0.5)

[b] Exceeds acute risk to listed species level of concern (RQ ≥ 0.1)

Table 4-4. Mammalian chronic dietary-based acute RQs from acetamiprid application to various crops.

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Chronic Dietary-Based RQ[1]
Leafy Cole Crops and Turnip Greens	0.1 (4/7)	Short Grass	0.49
		Tall Grass	0.23
		Broadleaf Plants, Small insects	0.28
		Fruits, Pods, Seeds, Large Insects	0.03
Fruiting Vegetables	0.075 (4/7)	Short Grass	0.37
		Tall Grass	0.17
		Broadleaf Plants, Small insects	0.21
		Fruits, Pods, Seeds, Large Insects	0.02
Citrus	0.25 (2/7)	Short Grass	0.70
		Tall Grass	0.32
		Broadleaf Plants, Small insects	0.39
		Fruits, Pods, Seeds, Large Insects	0.04
	0.11 (5/7)	Short Grass	0.64
		Tall Grass	0.29
		Broadleaf Plants, Small insects	0.36
		Fruits, Pods, Seeds, Large Insects	0.04
Pome Fruit	0.15 (4/12)	Short Grass	0.65
		Tall Grass	0.30
		Broadleaf Plants, Small insects	0.37
		Fruits, Pods, Seeds, Large Insects	0.04
Sweet Corn	0.054 (4/7)	Short Grass	0.27
		Tall Grass	0.12

Use	App. Rate lbs ai/A (#app/interval days)	Food Items	Chronic Dietary-Based RQ[1]
		Broadleaf Plants, Small insects	0.15
		Fruits, Pods, Seeds, Large Insects	0.02
Asparagus	0.1 (2/10)	Short Grass	0.27
		Tall Grass	0.13
		Broadleaf Plants, Small insects	0.15
		Fruits, Pods, Seeds, Large Insects	0.02
Soybeans	0.04 (2/7)	Short Grass	0.11
		Tall Grass	0.05
		Broadleaf Plants, Small insects	0.06
		Fruits, Pods, Seeds, Large Insects	0.01

[1] NOAEC = 160 mg/kg-diet

Terrestrial Invertebrates

Acetamiprid is classified as moderately toxic to young adult honeybees on an acute contact exposure basis (contact 48-hr LD_{50} 8.1 µg/bee) (Atkins *et al.*, 1976). Potential effects to terrestrial invertebrates from chronic exposure to acetamiprid could not be assessed due to a lack of exposure data. Screening-level risk assessments do not typically quantify risks to terrestrial invertebrates; however, toxicity information for beneficial insects is used to qualitatively characterize potential hazards to beneficial insects and to develop precautionary label language where necessary. This topic is discussed further in the Risk Description section of the document.

4.1.B.ii. Proposed Bait Uses

For proposed bait applications, it is assumed that bait containing acetamiprid is ingested by non-target animals and may evoke a toxic response. The first approach to evaluate risk from the bait use (see Section 3.1.A.ii) is to measure exposure as mg ai/kg-bw and use LD_{50} values from single acute dose oral toxicity studies to derive RQs. The LD_{50} values are adjusted for the weight of the assessed animals (birds: 20, 100, 1000 g; mammals: 15, 35, 100 g) (Table 4-5). Avian and mammalian RQs based on acute oral toxicity data are provided in Table 4-6. Acute risk to listed and non-listed species LOCs are exceeded for both birds and mammals. It should be noted that RQs do not depend on the application rate since it is assumed that 100 percent of the animal's diet is bait granules. Further discussion of the sensitivity of RQs to assumptions of dietary bait consumption can be found in the Risk Description section of this document.

Table 4-5. Formulas for calculation of weight-adjusted avian and mammalian acetamiprid LD_{50} values.

Adjusted avian LD_{50}: $Adj.LD_{50} = LD_{50}\left(\frac{AW}{TW}\right)^{(x-1)}$ where:

$Adj.\ LD_{50}$ = adjusted LD_{50} (mg/kg-bw)
LD_{50} = endpoint reported from bird study (mg/kg-bw)
TW = body weight of tested animal (12.1g zebra finch)
AW = body weight of assessed animal (20g, 100g, and 1000g)
x = Mineau scaling factor for birds; EFED default 1.15

Adjusted mammalian LD_{50}: $Adj.LD_{50} = LD_{50}\left(\frac{TW}{AW}\right)^{(0.25)}$ where:

$Adj.\ LD_{50}$ = adjusted LD_{50} (mg/kg-bw)
LD_{50} = endpoint reported from mammal study (mg/kg-bw)
TW = body weight of tested animal (default value of 350 g laboratory rat)
AW = body weight of assessed animal (15g, 35g, 1000g)

Table 4-6. Bird and mammal acute RQs based on a single-dose of acetamiprid through consumption of bait.

	Weight (g)	Acetamiprid intake (mg ai/kg-bw/day)[1]	Adjusted LD_{50} (mg ai/kg-bw)[2]	RQ
Passeriform Birds*	20	1410.8	6.12	231[a]
	100	1108.2	7.80	142 [a]
	1000	784.5	11.01	71.3 [a]
Rodent Mammals	15	1059.4	320.88	3.30 [a]
	35	732.2	259.63	2.82 [a]
	1000	169.8	112.30	1.51[a]

*surrogate for reptiles and terrestrial-phase amphibians
[1] See Tables 3-15 and 3-16 for derivation
[2] See Table 4-5 for derivation.
[a] Exceeds acute risk to listed and non-listed species level of concern (RQ ≥ 0.5)

The LD_{50} ft^{-2} method yielded lower avian and mammalian acute RQ values (Table 4-7) than the total daily diet method. Acute risk to listed and non-listed species LOCs are exceeded for small and medium weight classes of birds, while the acute risk to listed species LOC is exceeded for only lightest weight class of mammals.

Table 4-7. Avian and mammalian LD_{50} ft^{-2} RQs for a single proposed bait application of acetamiprid.

	Weight (g)	RQ
Birds	20	7.0[a]
	100	1.1[a]
	1000	0.08
Mammals	15	0.18[b]
	35	0.09
	1000	0.01

[a] Exceeds acute risk to listed and non-listed species level of concern (RQ ≥ 0.5)
[b] Exceeds acute risk to listed species level of concern (RQ ≥ 0.1)

Avian chronic RQs for bait consumption are not calculated since the bird reproduction endpoint is non-definitive (*i.e.*, <60.2 mg ai/kg-diet). Avian chronic risk is discussed in the Risk Description section of the document. Mammalian chronic RQ values are based on adjusted NOAEL values derived from the equation in Table 4-8; RQs exceed agency LOCs for all weight classes (Table 4-9).

Table 4-8. Formula for Calculation of Weight-adjusted Mammalian NOAEL.

Adjusted mammalian NOAEL: $Adj.NOAEL = NOAEL\left(\frac{TW}{AW}\right)^{(0.25)}$ where:

Adj. NOAEL = adjusted NOAEL (mg/kg-bw)
NOAEL = endpoint reported from mammal study (7.10 mg/kg-bw)
TW = body weight of tested animal (146 g average female rat weight)
AW = body weight of assessed animal (15g, 35g, 1000g)

Table 4-9. Mammalian chronic RQs based on daily doses of acetamiprid through bait consumption.

	Weight (g)	Acetamiprid intake (mg ai/kg-bw/day)[1]	Adjusted NOAEL (mg ai/kg-bw)[2]	RQ
Rodent Mammals	15	1059.4	12.54	84.5 [a]
	35	732.2	10.15	72.1 [a]
	1000	169.8	4.39	38.7 [a]

[1] See Tables 3-15 and 3-16 for derivation
[2] See Table 4-8 for derivation.
[a] RQs exceed chronic risk level of concern (RQ ≥ 1).

4.1.C. Terrestrial Plants

The risk to listed species LOC is exceeded for at least one exposure category for all proposed crop uses except soybeans (Table 4-10). The risk to non-listed species LOC is exceeded for citrus and pome fruit uses only. No exceedances occur under this model for bait applications.

Table 4-10. Terrestrial plant RQs for ground and aerial application of acetamiprid to various crops and bait application.

Use	Application Method	Plant Type	Listed Status	RQs		
				Dry Areas	Semi-aquatic Areas	Spray Drift
Leafy Cole Crops and Turnip Greens; Sweet Corn; Asparagus	Ground	Monocot	Non-listed	<0.1	0.22	<0.1
			Listed	<0.1	0.66	<0.1
		Dicot	Non-listed	<0.1	0.32	0.18
			Listed	<0.1	0.66	0.40
	Aerial	Monocot	Non-listed	<0.1	0.24	<0.1
			Listed	0.13	0.71	<0.1
		Dicot	Non-listed	<0.1	0.34	0.89
			Listed	0.13	0.71	2.0[a]
Fruiting Vegetables	Ground	Monocot	Non-listed	<0.1	0.17	<0.1
			Listed	<0.1	0.50	<0.1
		Dicot	Non-listed	<0.1	0.24	0.13
			Listed	<0.1	0.50	0.30
	Aerial	Monocot	Non-listed	<0.1	0.18	<0.1
			Listed	<0.1	0.54	<0.1
		Dicot	Non-listed	<0.1	0.26	0.67
			Listed	<0.1	0.54	1.5[a]
Citrus	Ground	Monocot	Non-listed	<0.1	0.55	<0.1
			Listed	0.19	1.7[a]	<0.1
		Dicot	Non-listed	<0.1	0.80	0.45
			Listed	0.19	1.7[a]	1.0[a]
	Aerial	Monocot	Non-listed	0.11	0.60	<0.1
			Listed	0.32	1.8[a]	0.16
		Dicot	Non-listed	0.16	0.86	2.2[a]
			Listed	0.32	1.8[a]	5.0[a]
Pome Fruit	Ground	Monocot	Non-listed	<0.1	0.33	<0.1
			Listed	0.12	0.99	<0.1
		Dicot	Non-listed	<0.1	0.48	0.27
			Listed	0.12	0.99	0.60
	Aerial	Monocot	Non-listed	<0.1	0.36	<0.1
			Listed	0.19	1.1[a]	<0.1
		Dicot	Non-listed	<0.1	0.52	1.3[a]
			Listed	0.19	1.1[a]	3.0[a]
Soybeans	Ground	Monocot	Non-listed	<0.1	<0.1	<0.1
			Listed	<0.1	0.26	<0.1
		Dicot	Non-listed	<0.1	0.13	<0.1
			Listed	<0.1	0.26	0.16
	Aerial	Monocot	Non-listed	<0.1	<0.1	<0.1
			Listed	<0.1	0.29	<0.1
		Dicot	Non-listed	<0.1	0.14	0.36
			Listed	<0.1	0.29	0.80
Bait	Ground Scatter	Monocot	Non-listed	<0.1	0.18	<0.1*
			Listed	<0.1	0.53	
		Dicot	Non-listed	<0.1	0.26	
			Listed	<0.1	0.53	

* Bait pellets are spread as solid material on ground or in bait stations and are not subject to drift.
[a] Exceeds LOC of 1.0

4.2. Risk Description

This assessment examines proposed new or amended crop uses of acetamiprid as well as proposed new scatter bait and bait station uses. All of the proposed uses have seasonal application rates that are in between the highest (tree nuts, 0.72 lbs ai/A) and lowest (clover, 0.075 lbs ai/A) seasonal use rates that are already on the product labels. The tree nut and clover uses have already been evaluated in previous assessments (see DP Barcode D270386 and D364328). For aquatic organisms, risk analyses have been conducted for both existing and proposed acetamiprid uses, since revised model scenarios were run to account for collective exposure from parent, IM-1-4 degradate, and unextracted residues. For terrestrial organisms, risks are mainly determined by application rate, along with application interval, so no more or less extreme risks for terrestrial animals are expected for proposed uses as compared to existing tree nut and clover label uses, respectively. Therefore, only major aspects of risk to terrestrial organisms are discussed in the current assessment as well as any new information made available since the previous assessment. The reader should refer to the previous assessments for further information about study endpoints and risk characterization. One major difference from the last assessment is that new acute toxicity data are available for passerine birds exposed to acetamiprid, and the risk implications of this study are highlighted in the terrestrial portion of this section. In addition, the proposed soybean use differs from other uses of acetamiprid because a new product (Justice) is being proposed for registration which also contains the active ingredient bifenthrin. The potential ecological risks associated with application of bifenthrin to soybeans are discussed elsewhere (DP Barcode D336608).

Bait applications of acetamiprid, on the other hand, have not been assessed previously, and potential risks are discussed in detail here. Focus is given to terrestrial exposure scenarios, since bait granules can serve as a direct food source for terrestrial animals. The proposed bait application rate is 0.082 lbs ai/A, which is similar to the seasonal rate proposed for application to soybeans; however the current label states that scatter bait may be reapplied as needed.

4.2.A. Risks to Aquatic Organisms

The primary risk posed to aquatic organisms by acetamiprid and its degradate of concern (IM-1-4) is to invertebrates. Acetamiprid is considered very highly toxic to freshwater and estuarine/marine invertebrate species based on available acute toxicity tests. The acute risk to listed species LOC is exceeded for both freshwater and estuarine/marine invertebrates for all existing and proposed crop uses of acetamiprid except for clover (exceeds for freshwater invertebrates only). The acute risk to non-listed species LOC is exceeded for 17 of the 20 crop uses in freshwater invertebrates, including five of the seven proposed new label uses (leafy cole crops, fruiting vegetables, citrus, sweet corn, pome fruit), as well as 10 of the 20 crop uses in estuarine/marine invertebrates, including three of the seven proposed uses (leafy cole crops, citrus, pome fruit). The chronic risk LOC is exceeded for both freshwater and estuarine/marine invertebrates for all crop uses of acetamiprid except for clover (exceeds for freshwater invertebrates only). The application rate for crops would have to be less than 0.02 lbs ai/A per season to avoid acute or chronic risk LOC exceedances.

The risk picture for aquatic invertebrates described in the previous paragraph is based on comparison of acetamiprid toxicity endpoints against combined exposure values for acetamiprid, IM-1-4, and unextracted residues. This assumes that acetamiprid and IM-1-4 are of equivalent toxicity across aquatic invertebrates, which is based on similar acute endpoint values for *Daphnia* (LC_{50} 50 mg ai/L for acetamiprid; 43.9 mg ai/L for IM-1-4). Conversely, in mysid shrimp, toxicity is approximately three times higher in the parent versus degradate, resulting in some uncertainty as to the relative toxicity of acetamiprid and IM-1-4 in estuarine/marine invertebrates. There is no data on the toxicity of IM-1-4 in chironomids or amphipods (*Gammarus fasciatus*), which are two of the most sensitive aquatic species tested with acetamiprid. Data on these or other aquatic invertebrate species, particularly estuarine/marine invertebrates, would serve to decrease uncertainty as to the relative toxicity of acetamiprid and IM-1-4. Due to this uncertainty, a conservative approach was used in this assessment in which acetamiprid and IM-1-4 are considered equally toxic for all aquatic organisms. However, if IM-1-4 exposure values were not included in RQ calculations (*i.e.*, parent plus unextracted residue values only), risk values would be approximately one quarter of those for parent, IM-1-4, and unextracted residues combined.[21] Under this scenario, there would be no acute non-listed LOC exceedences for estuarine/marine invertebrates, but acute listed and chronic LOC exceedences would still occur for some uses.

The risk picture presented for aquatic invertebrates further assumes that unextracted residues include the parent compound. If unextracted residues were demonstrated to be comprised of compounds other than acetamiprid, use of parent-only exposure values in RQ calculations would be more appropriate. Under a parent plus IM-1-4 exposure scenario, RQs for estuarine/marine invertebrates would be approximately one half of those for parent, IM-1-4, and unextracted residues combined. Under this scenario, there would be no acute non-listed LOC exceedences for estuarine/marine invertebrates, but acute listed and chronic LOC exceedences would still occur for some uses.

The nature of the risk to aquatic invertebrates from scatter bait applications changes substantially based on whether the "high" (24 applications per year) or "low" (1 application per year) application scenario is used. In the case of freshwater invertebrates, there are acute risks of concern for both listed and non-listed species in the high scenario, while there are only risks to listed species in the low scenario. For estuarine/marine invertebrates, the acute risk LOC is exceeded for listed and non-listed species in the high scenario, while there are no exceedances for the low scenario. There are chronic risks of concern to both freshwater and estuarine/marine invertebrates in the high application scenario, but no exceedences in the low application scenario. However, any additional applications of bait above the low scenario rate would lead to exceedance of the chronic risk LOC. These results emphasize the critical variation in potential risk depending on how the application rate is defined on the label. The proposed label states that bait can be reapplied as needed, and both the high and low scenario rates are therefore possible. Nevertheless, even a single application at the proposed label rate would result in risks of concern.

[21] These estimates of projected differences in risk values for scenarios excluding IM-1-4 or unextracted residues are only an approximation and are based on exposure calculations for cucurbits (the highest existing crop use).

As for the crop uses, aquatic exposure values used for bait in this assessment are for parent, IM-1-4 degradate, and unextracted residues combined. Therefore the same uncertainties regarding the relative toxicity of acetamiprid and IM-1-4 to estuarine/marine invertebrates as well as in the half-life of the parent compound (due to unidentified unextracted residues) applies for bait applications as well. If parent alone or parent plus unextracted residue exposure values were used to calculate RQs, the acute listed species and chronic LOCs would still be exceeded for the high scenario bait use, but the non-listed LOC would not be exceeded. These direct risks are not expected for the use of the bait in a station since bait would not likely fall out of the station onto the ground surface, preventing movement of acetamiprid into surface water.

Based on these data, mortality of sensitive aquatic invertebrates following acute exposure would be expected at the proposed use rates for the crop and scatter bait uses. Since invertebrates are a major component of aquatic ecosystems and food webs, effects on this group could bring about significant changes in community structure, which could alter aquatic ecosystem function. Placing bait in a station that prevents the bait from being scattered onto the surface of the ground would prevent acetamiprid from moving into the aquatic environment and decrease risk to aquatic invertebrates from this use.

Overall, direct risks to fish and aquatic plants are not expected for the proposed uses, although there are some areas of potential uncertainty. In fish, acetamiprid ranges from slightly toxic to practically non-toxic on an acute exposure basis when mortality is the endpoint of focus. However, sublethal effects, particularly darkened body pigmentation, were observed in all three available fish acute studies, in some cases at much lower concentrations than where mortality was observed. While no direct quantifiable link between this effect and reduced mortality, growth, and fecundity can be made at this time, the potential for sublethal effects to fish exposed in the field may occur and may be biologically relevant.

Due to the potential for direct effects to aquatic invertebrates, birds, and mammals from the proposed uses, indirect effects to aquatic invertebrates, fish, and aquatic vascular plants may occur. Indirect effects may result from direct effects to a species that is important as a food item, in maintaining habitat, or in promoting dispersal, and pollination of another species. Aquatic invertebrates are an important food item for a number of species. Birds and mammals are important in seed dispersal and pollination of aquatic vascular plants. Aquatic vascular plants are important in maintaining habitat and are food items for other aquatic taxa and some terrestrial taxa. Therefore, indirect effects to all taxa in the aquatic environment may occur from the proposed uses.

4.2.B. Risks to Terrestrial Organisms

4.2.B.i. Proposed Crop Uses

Acetamiprid is considered to be very highly toxic to passerine birds (LD_{50} 5.68 mg ai/kg-bw) based on a recently submitted acute oral toxicity study (MRID 48407701). Based on these data, acute risk to listed and non-listed species LOCs are exceeded for most food categories for passerines, even for the proposed soybean use, which has an application rate that is less than half that of any other proposed use. Application rates would have to fall below 0.0012 lbs and 0.006 ai/A (assuming two applications per season) to remain below avian acute risk to listed and non-listed LOCs, respectively. A previously submitted study (MRID 44651869) showed that acetamiprid is moderately toxic to bobwhite quail (LD_{50} 84.4 mg ai/kg-bw) on an acute oral exposure basis, suggesting that toxicity is not limited to passerines. An additional point of concern regarding the passerine study results is that the difference in test substance concentrations where no mortality (2.5 mg/kg-bw) and complete mortality (10 mg/kg-bw) was observed in test birds is small. These data indicate that acetamiprid has a relatively steep dose-response relationship in passerine birds and that minor shifts in application rates can have potentially marked effects on the numbers of birds affected. Taken together, these data suggest that acetamiprid may pose a direct risk for passerines birds across all size classes and foraging categories evaluated, even when application rates are low as in the case of soybeans.

Dietary-based RQs were not presented for birds in this assessment because both available dietary studies yielded non-definitive LC_{50} values. If RQs were calculated based on the highest concentration tested in these studies (*i.e.*, 5,000 mg ai/kg-diet), all values across proposed uses would be less than 0.1, suggesting low risk. However, due to the low number of species tested and the observed mortalities in the submitted studies, there is uncertainty in this risk estimate. Current Agency guidance states that risks to non-target species should be assumed and that further data collection is recommend in cases where a definitive LC_{50} value is not established and mortalities are noted in submitted studies.

Chronic avian risk values could not be calculated since reduced male body weight gain was observed at the lowest concentration tested (60.2 mg ai/kg-diet) in the submitted reproduction study. Therefore chronic risk to birds is assumed in this assessment. If the LOAEC (60.2 mg ai/kg-diet) for the reproduction study were used in risk estimation, it would exceed the chronic risk LOC of 1 for three of the seven proposed uses (leafy cole crops, citrus, pome fruit). Moreover, the experimental NOAEC for birds could be significantly lower, supporting the potential for risk. Agency guidance states that chronic risks to birds should be assumed until additional study data are submitted establishing a definitive endpoint.

The only terrestrial toxicity data available for the Justice formulation (co-formulated with bifenthrin) is an acute up and down oral toxicity test in rats (MRID 48404404) which resulted in zero moralities out of three individuals tested at 270 mg/kg (35.1 mg ai/kg acetamiprid) and two mortalities out of two individuals tested at 540 mg/kg (70.2 mg ai/kg acetamiprid). The study author reported the LC_{50} as 438.5 mg/kg (57.0 mg ai/kg acetamiprid) with a 95% confidence interval of 270-540 mg/kg (35.1-70.2 mg ai/kg). This is approximately 2.5 fold more acutely toxic to rats than acetamiprid technical (146 mg ai/kg-bw; MRID 44651833). However, since only 5 individuals were examined in the up and down study, the uncertainty around toxicity of the Justice formulation relative to acetamiprid technical is high. Moreover, there are no other toxicity data on this formulation for other terrestrial organisms.

EFED currently does not estimate risk quotients for terrestrial non-target insects. However, acute contact studies suggest that acetamiprid is moderately toxic to honeybees, which triggered an additional set of studies. A toxicity of residues on foliage study was submitted (MRID 44651875) but was deemed unacceptable due to low recovery of acetamiprid on treated foliage. Submission of an acceptable foliar residues toxicity study (OPPTS 850.3030) would help to reduce uncertainty in toxicity due to exposure from direct treatment. In addition, since acetamiprid is a system compound, residue data from pollen and nectar (non-guideline study) would further serve to reduce the uncertainty around potential exposure of bees to acetamiprid while foraging,

Two honeybee non-guideline semi-field studies were also conducted to evaluate the possible effect of acetamiprid on behavior (MRIDs 45932504; 45932505), and were rated as "supplemental"[22]. Both studies used tents to expose honeybees via contact with forage and/or overspray, and application rates were equivalent to 0.15 and 0.09 lbs ai/A. Mortality, flight frequency, and foraging behavior were evaluated relative to a control and a known toxic standard. No significant effects on any measurement endpoints were observed in either study from acetamiprid treatments. Although short-distance foraging behavior was not significantly affected in the semi-field studies, neither of these studies can address whether acetamiprid affects the ability of honeybees to navigate back to the hive from any significant distance. Honeybees have a forage range of up to five miles, while the tents in both studies were 40 feet long.

Several open literature studies of acetamiprid effects on honeybees were made available near or after the time of the last ecological risk assessment of acetamiprid. El Hassani *et al.* (2008) exposed bees to 0.1, 0.5, and 1 μg of active ingredient, and recorded increases in sucrose responsiveness, locomotor activity (total length walked), and responsiveness to water (proboscis extension reflex after stimulation by water), which are all considered activating effects since they signify increases in specific functions. Conversely, the lowest dose of acetamiprid (*i.e.*, 0.1 μg/bee) also impaired olfactory-related learning performance. A follow-up study by Aliouane *et al.* (2009) supported the previous water responsiveness finding. Laurino *et al.* (2011) found increased mortality in bees that ingested 50 and 100 ppm (ng/μl) of a formulation containing acetamiprid (5% ai). Mortality attributed to acetamiprid in the higher dose group was 50.85% compared to the control group, but these effects were only seen in bees that were starved for two hours before dosing. In the same study, bees fed sugar did not show any significant mortality from oral or indirect contact exposure to acetamiprid over a 72-hour observation period. In the above studies, acetamiprid generally exhibited lower toxicity to bees than a small sample of other neonicotinoids insecticides (*e.g.*, clothianidin). This supports a previous open literature laboratory study suggesting that nitroguanidine substituted neonicotinoids (*e.g.*, clothianidin, imidacloprid, thiamethoxam and dinotefuran) are more toxic to bees than their cyano-substituted neonicotinoids (*e.g.*, acetamiprid, thiacloprid) (Iwasa *et al.*, 2004). However, El Hassani *et al.* (2008) did show that acetamiprid, but not thiamethoxam, had a detectable impact on bee behavior at sublethal doses.

Neonicotinoid insecticides have been implicated in affecting bee behavior and potentially influencing the ability of honeybees to forage successfully (Decourtye *et al.*, 2004). The available studies on behavior suggest that acetamiprid does not induce such an effect. It is difficult to be definitive, however, given that all the studies are semi-field studies conducted in

[22] Note: non-guideline studies cannot be rated "acceptable" since there are no guideline standards

relatively small tents. Given that honeybees may forage miles from the hive, uncertainty remains regarding possible effects on bee behavior. The current set of open literature studies for acetamiprid is still too nascent to make significant inferences about effects on bee survival, growth, or reproduction. Additional discussion of potential risks to pollinators can be found in a previous new use risk assessment (DP Barcode D364328). Although a number of measurement endpoints have been discussed in the open literature relative to the neonicotinoid insecticides and more specifically to acetamiprid, many of these endpoints do not have clear linkages to EPA assessment endpoints of impaired growth, survival and reproduction of the level of the individual bee or at the colony level. At this time, the available data suggest that acetamiprid is less toxic to adult honeybees, on a contact exposure basis, than the nitroguanidine-substituted neonicotinoids; however, acetamiprid can be as toxic as the nitroguanidine-substituted neonicotinoids in the presence of a P450 metabolism inhibitor such as piperonyl butoxide. Acetamiprid could be tank mixed with this compound. Additionally, there is uncertainty regarding the toxicity of the acetamiprid to developing brood. Since one of the uses of acetamiprid is as an ovicide, potential effects to young bees could exist. Data on larval toxicity (non-guideline study) would reduce this uncertainty.

Two previously submitted guideline studies on terrestrial plants suggest that acetamiprid is particularly toxic to lettuce as compared to other plant species tested. Since lettuce serves as a surrogate for broadleaf monocots, potential toxicity to this larger group of plants is possible. Based on the lettuce endpoint, direct risk to listed dicots is expected for all proposed crop uses except soybeans. In addition, non-listed species LOCs are exceeded for both citrus and pome fruit uses. Following the last new use risk assessment, additional non-guideline phytotoxicity data were submitted for a suite of other lettuce varieties. The results suggest that phytotoxicity in lettuce is limited to buttercrunch, which was the variety originally tested in the guideline toxicity studies. Semi-aquatic exposure to both monocot and dicot plants result in exceedances of the listed species LOC for citrus and pome fruit uses when seedling emergence data are used from onions and cucumbers (see Table 3-27 for endpoints and Table 4-10 for RQ values). Therefore, exceedences occur even when the greater sensitivity of lettuce to acetamiprid is not considered.

A full set of aquatic plant toxicity tests was performed at maximum acetamiprid concentrations ranging from 1.0 to 1.3 mg ai/L, with no effects observed for apical endpoints. The highest aquatic EEC for any proposed or existing use of acetamiprid is 69 μg ai/L for cucurbits, which is more than 10 times below concentrations of the active ingredient where no effects were observed; therefore, it is unlikely that further toxicity testing would yield endpoint values that would approach Agency LOCs for aquatic plants.

Direct effects to species may result in indirect effects to other species by changing availability of prey, habitat, and other factors important to survival and reproduction.[23] Due to effects on numerous taxa, indirect effects to all taxa (except aquatic non-vascular plants) are expected for all crop uses.

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[23] Indirect effects to terrestrial and aquatic vascular plants may occur due to direct effects on birds and mammals that are important in seed dispersal or pollination of the plant.

4.2.B.ii. Proposed Bait Uses

The potential for acute and chronic risks to birds (and their surrogates) and mammals is greater for bait applications than for crops, since bait granules may serve as a direct source of food. In the first exposure scenario examined, where animals feed solely on bait to achieve their entire daily dietary intake, acute risk to listed and non-listed species LOCs are exceeded for all weight classes of birds (RQ range: 71 to 230) and mammals (RQ range: 1.5 to 3.3) evaluated (Table 4-6). Although a diet consisting of only bait in a given day may be conservative, it is conceivable considering the low daily intake (in absolute terms) of a small bird and the high availability of bait pellets spread over a given area. For example, the estimated daily food intake of a 20 g bird is 5.6 g (see Table 3-14 for calculation). Under the currently proposed application rate for scatter bait (3 oz. per 500 ft^{-2}), a 20 g passerine bird would only need to consume available pellets within a 33 ft^{-2} area to meet its estimated daily intake value, while a 15 g rodent mammal would need to consume all bait within a 19 ft^{-2} area. Even if a bird or mammals would consume a one quarter of their daily diet as bait, LOC exceedences would still be high. Based on available passerine data, birds in the 20, 100, and 1000 g weight categories would only have to consume 0.024, 0.156, and 2.2 g of bait, respectively, to reach their adjusted LD_{50} values.

The LD_{50} ft^{-2} method is an alternative approach for evaluating acute risk from bait exposure. Unlike the total daily consumption method described in the previous paragraph, the LD_{50} ft^{-2} risk value is based on how much bait an animal can consume per unit area. This allows direct comparison of application rate to risk. Acute risk to listed and non-listed species LOCs are exceeded for small- and medium-sized birds based on LD_{50} ft^{-2} calculations. For mammals, only the acute risk to listed species LOC is exceeded for the smallest class of mammals. In general, the RQs for both birds and mammals using this approach are much lower than the total daily consumption approach described earlier. The limitation to the LD_{50} ft^{-2} method is that the biological relevance of a single square foot of feeding area for a bird or mammal is not documented, and it is feasible that an animal can consume substantially more bait than what is distributed over this small area. For birds, application rates would have to fall below 0.04 and 0.22 oz per 500 ft^{-2} in order to not exceed Agency listed and non-listed LOCs, respectively, under the LD_{50} ft^{-2} model.

An additional method for calculating acute risk from bait through the dietary route is to divide the amount of bait ingested by the dietary LC_{50} toxicity values for birds and mammals. In this assessment, dietary-based RQs were not derived for mammals or birds. For mammals, an appropriate acute dietary toxicity study does not exist. For birds, dietary toxicity endpoints are non-definitive; however, if RQs were to be calculated based on the highest dietary concentration tested where no effects were observed (*i.e.*, 5,000 mg ai/kg-diet), the RQ value would be 1, since the concentration of acetamiprid in the bait is also 5,000 mg ai/kg. This would exceed the Agency LOC for both listed and non-listed species.

Chronic risks were evaluated for mammals only, since a NOAEC was not established for birds, and chronic risk LOC for mammals was exceeded for all weight classes (RQ range: 39 to 84; Table 4-9). These chronic risk calculations were also based on the assumption of a daily diet consisting of all bait pellets, which is conservative. EFED has not established an approach for evaluating chronic risk per unit area similar to the acute LD_{50} ft^{-2} method. Although chronic risk from bait was not evaluated for birds, there is considerable potential for risk. If the LOAEC from the avian reproduction study is used for risk calculation, it results in an RQ of 83 (5000 mg ai/kg-bait divided by LOAEC value of 60.2 mg ai/kg-diet). Since the NOAEC is potentially much lower than the LOAEC, higher RQs are possible exist.

In summary, there is potential for risk to birds and mammals from bait consumption. Some of the uncertainty around these risk estimates is due to a lack of understanding of how much bait a given animal would reasonably consume and whether the bait is an attractive food source based on characteristics such as appearance and palatability. However, the analyses described above show that consumption of even modest amounts of bait (*e.g.*, amount in one square foot) poses a risk. Additional uncertainty is also generated by the potential for animals to feed on bait over multiple days. Both acute and chronic bait consumption analyses assume that a given bird or mammal is only feeding on bait during a single day. However, the label states that bait may be reapplied as needed, so it is possible that bait is available to the same individual across multiple days. The scatter bait is likely to pose a greater risk to animals than a hanging bait station, since the former is openly exposed on the ground. However, the label states that any commercial bait station may be used, and it is unclear whether some bait stations may actually provide access to birds feeding above ground. If the bait station prevented access to birds and mammals, this would eliminate risk from the bait station use.

As an insecticide, acetamiprid has the potential to affect nontarget terrestrial invertebrates. The discussion on risk to terrestrial invertebrates for uses on agricultural crops also applies to the uses of acetamiprid as bait (see Section 4.2.B.i).

Direct effects to species may result in indirect effects to other species by changing availability of prey, habitat, and other factors important to survival and reproduction.[24] Due to effects on numerous taxa, potential indirect effects to all taxa (except aquatic non-vascular plants) are possible for the scatter bait use and for the bait station use if the bait may be moved out of the bait station or if birds and mammals may have access to the bait in the bait station. However, if the bait station use limits access to birds and mammals and prevents the bait from falling to the ground surface, use of the bait in a station would only have the potential to cause effects to terrestrial invertebrates.

4.2.B.iii. Risk Due to Residues in Irrigation Water

Residues of acetamiprid in surface or ground water that is used for irrigation of plants could result in potential injury to nontarget plants. Assuming an acre of land is irrigated with one inch of contaminated water, the 69.21 µg ai/L peak surface water EEC is equivalent to an application rate of 0.016 lbs ai/A (Appendix F). The most sensitive of the available endpoints, the NOAEC for lettuce from the seedling emergence study is 0.0025 lbs ai/A and the EC_{25} is 0.00056 lbs ai/A. The resulting RQs are 6.3 for listed species (EEC/NOAEC = 0.016/0.0025 lbs ai/A= 6.3) and 2.8 for non-listed species (EEC/EC_{25} = 0.0056 lbs ai/A/ 0.016 = 2.8). Both of these RQs are

[24] Indirect effects to terrestrial and aquatic vascular plants may occur due to direct effects on birds and mammals that are important in seed dispersal or pollination of the plant.

above the Agency's LOC of 1.0 for terrestrial plants. EECs need to be less than 11 µg/L to have no risk concern to plants (NOAEC × 1 conversion factor/226,625 lbs water per acre[25] = EEC; see Appendix F for explanation of the calculation). The uses that do not result in a risk concern using EECs for plants due to residues in irrigation water include uses on clover, asparagus, and one application of bait. Ground water EECs are much lower than surface water EECs and RQs range from 0.03 to 0.07 and do not result in LOC exceedances. The uncertainties in assuming that unextracted residues and IM-1-4 are potential residues of concern also apply to this discussion of risk. The sensitivity of aquatic plants to IM-1-4 is unknown. The EECs and RQs estimated for the parent alone could be reduced by a factor of 0.1 to 0.07 based on EECs for parent plus IM-1-4 plus unextracted residues in one PRZM/EXAM scenario being 10 to 13x the EEC for the parent alone. If IM-1-4 and unextracted residues were not considered in estimation of EECs, the RQs for this pathway would be lower than the LOC. Information on the identity or availability of the unextracted residues and the sensitivity of plants to IM-1-4 would reduce the uncertainty in regards to this pathway.

4.2.C. Review of Incident Data

No ecological incidents related to acetamiprid have been entered into U.S. EPA's Ecological Incident Information System (EIIS) or into the Avian Incident Monitoring System (AIMS; American Bird Conservancy 2009) as of August 17, 2011. The absence of reported incidents should not be construed as the absence of incidents. Incident reports for non-target organisms typically provide information only on mortality events and plant damage. Sublethal effects in organisms such as abnormal behavior, reduced growth, or impaired reproduction are rarely reported, except for phytotoxic effects in terrestrial plants. EPA's changes in the registrant reporting requirements for incidents in 1998 may have further reduced the likelihood of incident reports. Registrants are now only required to submit detailed information on "major" fish, wildlife, and plant incidents. Minor fish, wildlife, and plant incidents, as well as all other non-target incidents, are generally reported in aggregate and are not included in EIIS; however, no aggregate incidents have been recorded for acetamiprid.

4.2.D. Federally Threatened and Endangered (Listed) Species Concerns

Based on this screening-level assessment, there are potential indirect effects to all listed species for each of the three newly proposed uses of acetamiprid (Table 4-11).

[25] One acre has 6,272,640 cubic inches of water on the field. The one acre field with one inch of water has 3,630 cubic ft of water (6,272,640 x 0.00058 cubic ft/cubic inch). The field has 27,156 gallons of water (3,630 cubic ft x 7.481 gallons/cubic ft). Therefore, one inch of water on the one acre field weighs 226,625 lbs (27,156 gallons x 8.3453 lbs/gallon of water).

Table 4-11. Summary of the potential for direct and indirect effects to different taxa from proposed uses of acetamiprid. Unless otherwise indicated, direct risk may occur for both listed and non-listed species. Indirect effects are assessed for listed species only.

D = Direct effects; I = Indirect effects

Taxon	Leafy Cole Crops and Turnip Greens, and Sweet Corn	Asparagus	Fruiting Vegetables	Citrus	Pome Fruit	Soybeans	Scatter Bait[3]
Terrestrial and semi-aquatic plants (monocots)	I	I	I	D (listed only)/I	D (Listed only)/I	I	I
Terrestrial and semi-aquatic plants (dicots)	D (listed only)/I	D (listed only)/I	D only/ I	D / I	D / I	I	I
Birds, terrestrial phase amphibians, and reptiles[2]	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I
Mammals	D (acute, listed only)/I	D (acute, listed only)/I	D (acute, listed only)/I	D (acute, listed only)/I	D (acute, listed only)/I	I	D (acute and chronic)
Aquatic vascular plants	I	I	I	I	I	I	I
Aquatic non-vascular plants	None	None	None	None	None	None	None
Freshwater fish and aquatic phase amphibians[2]	I	I	I	I	I	I	I
Freshwater invertebrates	D (acute and chronic)/I	D (acute listed only and chronic)/ I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute listed only and chronic)/I	D (acute and chronic)/I
Marine/estuarine fish	I	I	I	I	I	I	I
Marine/estuarine invertebrates	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I	D (acute and chronic)/I

[1] Direct effects to species may result in indirect effects to other species by changing availability of prey, habitat, and other factors important to survival and reproduction. Indirect effects to terrestrial plants and aquatic nonvascular plants may occur due to effects on mammals and birds that are important in seed dispersal or pollination of the plant.

[2] Terrestrial and aquatic phase amphibian effects are based on surrogate information from birds and freshwater fish, respectively.

[3] Risk from bait applications depends on reapplication rate. The results are shown assuming 24 consecutive applications and a three day reapplication interval.

4.2.E. Co-occurrence Analysis

The goal of the analysis for co-location is to determine whether sites of pesticide use are geographically associated with known locations of listed species [following the convention of the Fish and Wildlife Service and the National Marine Fisheries Service (the Services). The word 'species' in this assessment may actually apply to a 'species', 'subspecies', Distinct Population Segment (DPS), or an Evolutionary Significant Unit (ESU)]. At the screening level, this analysis is normally accomplished using the LOCATES (version 2.2.0) database. The database uses location information for listed species at the county level and compares it to agricultural census data (from 2002) for crop production at the same county level of resolution. The product is a listing of federally-listed species that are located within counties known to produce the crops upon which the pesticide will be used for agricultural purposes. All taxonomic groups were considered in this analysis since either direct or indirect effects are projected for these groups. LOCATES could only be run for application to proposed crop uses because the database does not contain information on areas specific to bait application. LOCATES showed that all 48 contiguous US states have listed species associated with the crops proposed for treatment with acetamiprid. A summary of all listed species by state is provided in Appendix G.

This preliminary analysis indicates that there is potential for the proposed crop uses of acetamiprid on to overlap with listed species (and their designated critical habitat, if applicable) and that a more refined assessment is warranted. The more refined assessment should involve clear delineation of the action area associated with acetamiprid uses and best available information on the temporal and spatial co-location of listed species with respect to the action area. Such an analysis has not been conducted in this assessment. In addition, proposed bait uses could potentially impact all listed species since these uses are not geographically limited.

4.3. Description of Assumptions, Limitations, Uncertainties, Strengths, and Data Gaps.

4.3.A. Effects Uncertainties

The major toxicity data gaps and uncertainties associated with proposed uses of acetamiprid are as follows:

- This assessment assumes a total toxic residue approach for aquatic organisms. RQs were calculated by comparing toxicity endpoints to exposure values for acetamiprid, IM-1-4 degradate, and unextracted residues combined. This is based on two assumptions: (1) that acetamiprid and IM-1-4 are equally toxic to aquatic organisms; (2) that unextracted residues may consist of acetamiprid. The assumption of equal toxicity between acetamiprid and IM-1-4 is based on similar acute endpoint values for parent and degradate in *Daphnia* (freshwater species). Chironomids (freshwater species) are much more sensitive to acetamiprid than daphnids. However, there are no IM-1-4 toxicity data for chironomids, resulting in uncertainty since RQ values are based upon this taxon. There is additional uncertainty in assuming equivalent toxicity for estuarine/marine invertebrates, since the acute endpoint value in mysid shrimp is approximately three times higher in the parent versus IM-1-4 degradate. Removal of IM-1-4 from total aquatic exposure values would decrease RQ values for aquatic invertebrates by approximately 75%. Removal of unextracted residues from aquatic exposure values would decrease RQ values by approximately half.

- Avian acute dietary (850.2200) and chronic reproductive toxicity (850.2300) studies yielded non-definitive endpoints. Since mortalities were observed in both dietary studies, Agency guidance recommends that further data be collected at higher test substance concentrations. For the chronic study, a NOAEC value was not derived and the extent of possible risk to birds is unknown. Therefore chronic risk to birds is assumed in this assessment.
- The seedling emergence study in terrestrial plants (MRID 44988413) did not measure plant weight, which is one of the two major endpoints in this type of study, resulting in uncertainty regarding the effects of acetamiprid on plant growth. Based on current EFED standards, only scientifically sound plant weight data from a seedling emergence study is needed to fill this data gap (*i.e.*, new shoot length data is not needed).
- There are a number of data gaps and uncertainties related to toxicity of acetamiprid to terrestrial invertebrates, particularly bees:
    - Based on submitted acute toxicity data, acetamiprid is moderately toxic to honeybees on an acute contact exposure basis. Available literature suggests that cyano-substituted neonicotinoids such as acetamiprid affect bees less than nitroguanidine-substituted neonicotinoids. However, the body of literature is currently too nascent to make strong conclusions about the impact of acetamiprid on bee populations.
    - A foliage residue toxicity study (850.3030) was submitted but deemed unacceptable. An acceptable study would help decrease uncertainty around effects to honeybees from foliar exposure.
    - Since acetamiprid is systemic, there is also additional uncertainty surrounding exposure due to translocation of the chemical to pollen and nectar, upon which bees forage.
    - Semi-field studies conducted with acetamiprid on honeybees in tents were conducted but may not adequately depict effects under full field conditions where bees have to travel much greater distances.
    - Toxicity studies with acetamiprid have only been submitted for adult bees and do not address possible affects on brood survival. Since one of the uses of acetamiprid is as an ovicide, potential effects to young bees could exist.
    - It is uncertain if acetamiprid toxicity would increase in bees or other insects if it is used as a mixture with PBO, which could utilize the same P450 detoxification pathway.

- The proposed label for the scatter bait use of acetamiprid states that bait should be reapplied as needed, which does not provide sufficient detail for running specific exposure scenarios to determine potential risk. See section 4.2.B.ii for a full discussion of uncertainties related to proposed bait uses.
- Insufficient information is available to determine whether the bait formulation containing acetamiprid would attract or be palatable to non-target terrestrial organisms such as birds, mammals, and ground-nesting insects (*e.g.*, bees).
- The bait use label states that any standard fly bait station may be used to house bait pellets. It is not known whether some or all fly bait stations would allow access to birds or potentially improve access due to increased visibility resulting from elevation of the bait station from the ground.
- Only a few surrogate species are used to represent all fish, birds, mammals, invertebrates, and plants. Furthermore, there are no currently required toxicity tests for amphibians or reptiles; therefore, birds are used as surrogates for reptiles and terrestrial-phase amphibians, and freshwater fish are used as surrogates for aquatic-phase amphibians. In general, the representation of numerous species by a few commonly used laboratory species, which are often chosen for amenability to laboratory study, is a source of uncertainty.

4.3.B. Fate Uncertainties

Aerobic Aquatic and Anaerobic Aquatic Metabolism Data

Data on two sediments examining aerobic aquatic and anaerobic aquatic metabolism (OCSPP Guideline 835.4300 and 835.4400) are recommended; however, data are available for only one sediment. This could result in an underestimation or overestimation of typical half-lives in modeling. As only one data point was available for these studies, model inputs were estimated to be three times the measured values. Having data available from two sediments would allow estimation of a 90th percentile confidence bound on the mean, which would likely result in a lower input value for modeling. As a total toxic residue approach was used in modeling for the ecological risk assessment (including parent, IM-1-4, and unextracted residues) and the values used in modeling were high (1974 and 4116 days for total residues of concern), increasing the half-lives used in modeling would not be expected to substantially change the estimated EECs. Additionally, EECs for parent alone, for which aerobic aquatic and anaerobic aquatic model half-life inputs were much lower (75 days for aerobic aquatic and 975 days for anaerobic aquatic metabolism), also result in some LOC exceedances for the use where this was examined indicating that while the data may be used to refine and reduce the model inputs and LOC exceedances for some species, they would likely not result in eliminating the predicted risk to some aquatic species.

Identification of Unextracted Residues in Fate Studies

The identity of the unextracted residues is unknown in a number of submitted studies where unextracted residues made up much greater than 10% of applied radioactivity (<1 to 40%). This is a significant source of uncertainty in the risk assessment. Due to the uncertainty in the identity of these residues, it was assumed that the residues were of concern in estimating the half-lives of total residues of concern. For ecological risk assessment, the PRZM/EXAMS EECs for parent plus IM-1-4 plus unextracted residues were two times the EECs for the parent plus IM-1-4 If the identity of the unextracted residues were known, the degradate profile would likely change and some degradates that were previously not considered major degradates could become major degradates. Alternatively, more data could be provided on the extraction procedure and on the identity of the unextracted residues that provide evidence that these residues have been transformed into another material such as organic matter and the residues will not contribute to residues of concern. This risk assessment essentially assumes that the unextracted residues had a similar toxicity to the parent compound. This is a conservative assumption. The high percentages of unextracted residues present in the metabolism studies is a significant uncertainty. Data may be needed in the future to reduce this uncertainty.

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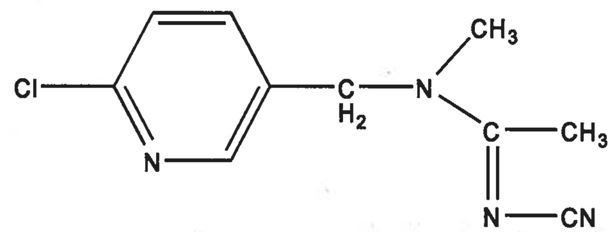
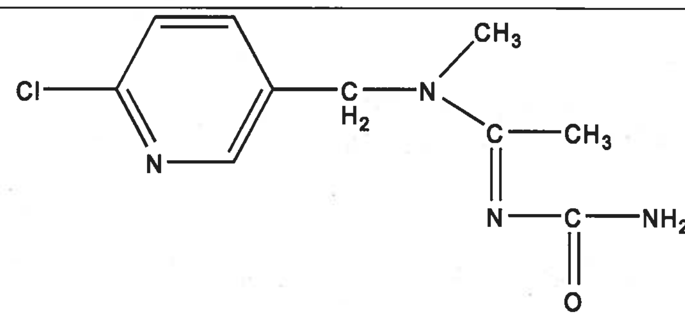
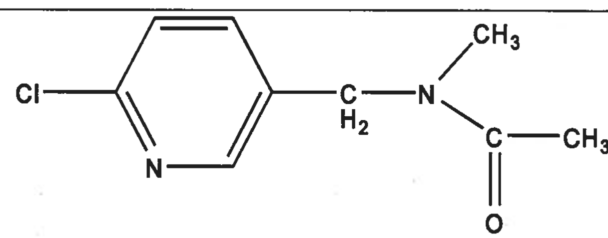
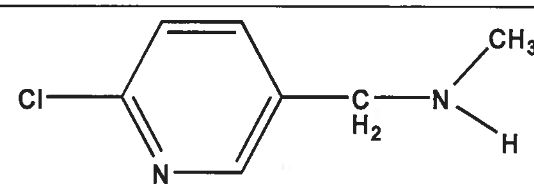
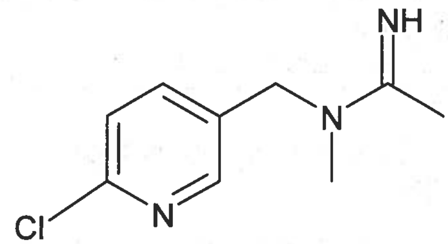
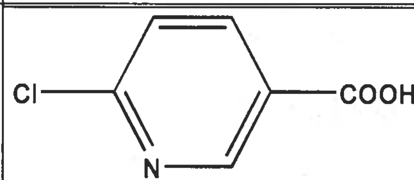
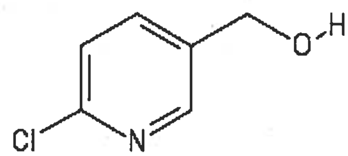
Appendix A: Supplemental Environmental Fate Information

Table A1. Structures of Acetamiprid and Its Environmental Transformation Products.

Code Name/ Synonym/ Chemical Name/ Formula/MW/ SMILES	Chemical Structure
Acetamiprid **IUPAC:** (E)-N^1-[(6-chloro-3-pyridyl)methyl]-N^2-cyano-N^1-methyl **CAS: (1*E*)-*N*-[(6-chloro-3-pyridinyl)methyl]-*N*'-cyano-*N*-methylethanimidamide** **CAS No.:** 135410-20-7 **Formula:** $C_{16}H_{11}CLN_4$ **MW:** 222.68 g/mol **SMILES:** Clc1ncc(cc1)CN(\C(=N\C#N)C)C	
IM-1-2 **IUPAC:** N^2-carbamoyl-N^1-((6-chloro-3-pyridyl)-methyl)-N^1-methylacetamidine **CAS No:** **Formula:** **MW:** 240.69g/mole	
IM-1-3 **IUPAC:** N-((6-chloro-3-pyridyl)methyl)-N-methylacetamide	
IM-1-4 **IUPAC:** N-methyl(6-chloro-3-pyridyl)methylamine **MW:** 155.5 g/mole **SMILES:** C1=C(C=CC(=C1)CN(C)[H])Cl	

Code Name/ Synonym/ Chemical Name/ Formula/MW/ SMILES	Chemical Structure
IM-1-5 **IUPAC:** (E)-N1-[(6-chloro-3-pyridyl)-methyl]-N2-cyano-N1-methylacetamidine	
IC-0 **IUPAC:** 6-chloronicotinic acid	
IM-0 **IUPAC:** 6-chloro-3-pyridylmethanol **SMILES:** C1=C(N=CC(=C1)CO[H])Cl	

Abbreviations MW =molecular weight.

Table A2. Maximum amount of applied radioactivity present as a specified compound in environmental fate studies submitted on acetamiprid.

Compound	Max %AR (Sampling Interval)	Final %AR (Sampling Interval)	Comment	Study Type	MRID
Acetamiprid	Not Applicable	95 (35 days)	pH 4 all temps	Hydrolysis	44651876
		97. (35 days)	pH 5 all temps	Hydrolysis	44651876
		93 (35 days)	pH 7 all temps	Hydrolysis	44651876
		88 (35 days)	pH 9 all temps	Hydrolysis	44651876
		54 (30 days)	Water	Aqueous Photolysis	44688509
		1 (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
		1 (187 days)	Clay loam 01/08	Aerobic Soil	46255603
		1 (187 days)	Clay loam 01/10	Aerobic Soil	46255603
		<1 (112 days)	Collumbey soil	Aerobic Soil	44699101
		<1 (365 days)	Loamy sand	Aerobic Soil	44651879
		nd (7 days)	Sandy Loam	Aerobic Soil	44651880
		46 (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
		3 (182 days)	Sandy loam, 20°C	Aerobic Soil	44651881
		<1 (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
		4 (178 days)	Clay loam, 10°C	Aerobic Soil	44651881
		5 (300 days)	Sandy loam	Aerobic Aquatic	44988513
		52 (365 days)	Loamy sand	Anaerobic Aquatic	44988512
IM-1-4	<1 (0 days)	<1 (35 days)	pH 4 all temps	Hydrolysis	44651876
	<1 (0 days)	<1 (35 days)	pH 5 all temps	Hydrolysis	44651876
	<1 (35 days)	<1 (35 days)	pH 7 all temps	Hydrolysis	44651876
	15 (35 days)	15 (35 days)	pH 9 all temps	Hydrolysis	44651876
	nd	nd	Water	Aqueous Photolysis	44688509
	21 (7 days)	1 (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	21 (7 days)	<1 (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	18 (7 days)	1 (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	61 (7 days)	26 (112 days)	Collumbey soil	Aerobic Soil	44699101
	73 (120 days)	61 (365 days)	Loamy sand	Aerobic Soil	44651879
	16 (7 days)	16 (7 days)	Sandy Loam	Aerobic Soil	44651880
	56 (14 days)	37 (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
	73 (14 days)	42 (182 days)	Sandy loam, 20°C	Aerobic Soil	44651881
	67 (3 days)	1 (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	73 (30 days)	54 (178 days)	Clay loam, 10°C	Aerobic Soil	44651881
	64 (60 days)	34 (300 days)	Sandy loam	Aerobic Aquatic	44988513
	27 (270 days)	14 (187 days)	Loamy sand	Anaerobic Aquatic	44988512
IM-1-5	na	na	pH 4 all temps	Hydrolysis	44651876
	na	na	pH 5 all temps	Hydrolysis	44651876
	na	na	pH 7 all temps	Hydrolysis	44651876
	na	na	pH 9 all temps	Hydrolysis	44651876
	nd	nd	Water	Aqueous Photolysis	44688509
	16 (187 days)	16 (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	12 (187 days)	12 (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	13 (7 days)	8 (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	na	na	Collumbey soil	Aerobic Soil	44699101

Compound	Max %AR (Sampling Interval)	Final %AR (Sampling Interval)	Comment	Study Type	MRID
	na	na	Loamy sand	Aerobic Soil	44651879
	na	na	Sandy Loam	Aerobic Soil	44651880
	na	na	Clay loam, 20°C	Aerobic Soil	44651881
	nd	nd	Sandy loam, 20°C	Aerobic Soil	44651881
	22 (13 days)	13 (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	nd	nd	Clay loam, 10°C	Aerobic Soil	44651881
	na	na	Sandy loam sediment	Aerobic Aquatic	44988513
	na	na	Loamy sand sediment	Anaerobic Aquatic	44988512
IC-0	na	na	pH 4 all temps	Hydrolysis	44651876
	na	na	pH 5 all temps	Hydrolysis	44651876
	na	na	pH 7 all temps	Hydrolysis	44651876
	na	na	pH 9 all temps	Hydrolysis	44651876
	nd	nd	Water	Aqueous Photolysis	44688509
	5.2 (7 days)	nd (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	7 (7 days)	nd (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	10 (7 days)	nd (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	11 (4 days)	1 (112 days)	Collumbey soil	Aerobic Soil	44699101
	5 (60 days)	3 (365 days)	Loamy sand	Aerobic Soil	44651879
	11 (2 days)	10 (7 days)	Collumbey Sandy	Aerobic Soil	44651880
	11 (120 days)	4 (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
	4 (120 days)	3 (182 days)	Sandy loam, 20°C	Aerobic Soil	44651881
	12 (7 days)	nd (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	3 (178 days)	3 (178 days)	Clay loam, 10°C	Aerobic Soil	44651881
	19 (180 days)	nd (300 days)	Sandy loam sediment	Aerobic Aquatic	44988513
	nd	nd (187 days)	Loamy sand sediment	Anaerobic Aquatic	44988512
IM-1-2	na	na	pH 4 all temps	Hydrolysis	44651876
	na	na	pH 5 all temps	Hydrolysis	44651876
	na	na	pH 7 all temps	Hydrolysis	44651876
	na	na	pH 9 all temps	Hydrolysis	44651876
	nd	nd	Water	Aqueous Photolysis	44688509
	36 (1 day)	nd (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	29 (3 days)	nd (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	28 (1 days)	nd (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	8 (1 day)	nd (112 days)	Collumbey soil	Aerobic Soil	44699101
	nd	nd	Loamy sand	Aerobic Soil	44651879
	55 (1 day)	nd (7 day)	Collumbey Sandy	Aerobic Soil	44651880
	<LOQ (2 days)	nd (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
	nd	nd	Sandy loam, 20°C	Aerobic Soil	44651881
	<LOQ (1 day)	nd (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	<LOQ (2 days)	nd (182 days)	Clay loam, 10°C	Aerobic Soil	44651881
	21 (30 days)	0.74 (300 days)	Sandy loam sediment	Aerobic Aquatic	44988513
	1 (90 days)	nd (365 days)	Loamy sand sediment	Anaerobic Aquatic	44988512
IM-0	na	na	pH 4 all temps	Hydrolysis	44651876
	na	na	pH 5 all temps	Hydrolysis	44651876
	na	na	pH 7 all temps	Hydrolysis	44651876

Compound	Max %AR (Sampling Interval)	Final %AR (Sampling Interval)	Comment	Study Type	MRID
	na	na	pH 9 all temps	Hydrolysis	44651876
	nd	nd	Water	Aqueous Photolysis	44688509
	nd	nd	Sandy Loam 01/07	Aerobic Soil	46255603
	2.21 (7 days)	nd (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	1 (14 days)	nd (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	na	na	Collumbey soil	Aerobic Soil	44699101
	na	na	Loamy sand	Aerobic Soil	44651879
	na	na	Collumbey Sandy	Aerobic Soil	44651880
	na	na	Clay loam, 20°C	Aerobic Soil	44651881
	na	na	Sandy loam, 20°C	Aerobic Soil	44651881
	na	na	Silty clay loam, 20°C	Aerobic Soil	44651881
	na	na	Clay loam, 10°C	Aerobic Soil	44651881
	na	na	Sandy loam sediment	Aerobic Aquatic	44988513
	na	na	Loamy sand sediment	Anaerobic Aquatic	44988512
IM-1-3	<1 (15 days)	<1 (35 days)	pH 4 all temps	Hydrolysis	44651876
	<1 (35 days)	<1 (35 days)	pH 5 all temps	Hydrolysis	44651876
	4 (22 days)	4 (35 days)	pH 7 all temps	Hydrolysis	44651876
	61 (35 days)	61 (35 days)	pH 9 all temps	Hydrolysis	44651876
	nd	nd	Water	Aqueous Photolysis	44688509
	nd	nd	Sandy Loam 01/07	Aerobic Soil	46255603
	3 (7 days)	nd (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	2 (7 days)	nd (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	3 (4 days)	nd (112 days)	Collumbey soil	Aerobic Soil	44699101
	3 (60 days)	<1 (365 days)	Loamy sand	Aerobic Soil	44651879
	nd	nd (7 days)	Collumbey Sandy	Aerobic Soil	44651880
	3 (28 days)	<1 (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
	<LOQ (14 days)	<LOQ (14 days)	Sandy loam, 20°C	Aerobic Soil	44651881
	2 (7 days)	0.71 (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	2 (122 days)	2 (122 days)	Clay loam, 10°C	Aerobic Soil	44651881
	1 (90 days)	nd (300 days)	Sandy loam sediment	Aerobic Aquatic	44988513
	8 (180 days)	6 (365 days)	Loamy sand sediment	Anaerobic Aquatic	44988512
Unidentified Compound	3 (14 days)	nd (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	1 (14 days)	nd (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	4 (187 days)	4 (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	4 (4 days)	nd (112 days)	Collumbey soil	Aerobic Soil	44699101
	2 (3 days)	nd (365 days)	Loamy sand	Aerobic Soil	44651879
	12 (7 days)	12 (7 days)	Collumbey Sandy	Aerobic Soil	44651880
	3 (56 days)	2 (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
	<1 (56 days)	<1 (56 days)	Sandy loam, 20°C	Aerobic Soil	44651881
	<1 (7 days)	nd (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	<1 (182 days)	<1 (182 days)	Clay loam, 10°C	Aerobic Soil	44651881
Unextracted Residues	26 (118 days)	19 (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	31 (28 days)	20 (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	29 (14 days)	28 (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	16 (112 days)	16 (112 days)	Collumbey soil	Aerobic Soil	44699101

Compound	Max %AR (Sampling Interval)	Final %AR (Sampling Interval)	Comment	Study Type	MRID
	21 (365 days)	21 (365 days)	Loamy sand	Aerobic Soil	44651879
	14 (7 days)	14 (7 days)	Collumbey Sandy	Aerobic Soil	44651880
	40 (182 days)	40 (182 days)	Clay loam, 20°C	Aerobic Soil	44651881
	26 (182 days)	26 (182 days)	Sandy loam, 20°C	Aerobic Soil	44651881
	21 (28 days)	18 (182 days)	Silty clay loam, 20°C	Aerobic Soil	44651881
	25 (178 days)	25 (178 days)	Clay loam, 10°C	Aerobic Soil	44651881
	38 (300 days)	38 (300 days)	Sandy loam sediment	Aerobic Aquatic	44988513
	17 (270 days)	17 (365 days)	Loamy sand sediment	Anaerobic Aquatic	44988512
CO_2	52 (118 days)	50 (187 days)	Sandy Loam 01/07	Aerobic Soil	46255603
	54 (91 days)	54 (187 days)	Clay loam 01/08	Aerobic Soil	46255603
	57 (118 days)	51 (187 days)	Clay loam 01/10	Aerobic Soil	46255603
	<1 (30 days)	<1 (30 days)	Water	Aqueous photolysis	44688509
	56 (112 days)	56 (112 days)	Collumbey soil	Aerobic Soil	44699101
	19 (270 days)	12 (365 days)	Loamy sand	Aerobic Soil	44651879
	44 (7 days)	44 (7 days)	Collumbey Sandy	Aerobic Soil	44651880
	5 (300 days	5 (300 days)	Sandy loam	Aerobic Aquatic	44988513
	1 (365 days)	1 (365 days)	Loamy sand sediment	Anaerobic Aquatic	44988512

Table A3. Summary of environmental fate and transport properties of 6-chloronicotinic acid, a degradate of acetamiprid

Parameter	Value(s)	Source	Study Classification	Comment
Aerobic Soil Metabolism Half-life	Half-life, linear regression[1]: 2.5 days (sandy loam soil at 20°C) 1.7 days (clay soil at 20°C) 6.6 days (loam soil at 20°C)	MRID 44651882	Supplemental	British soils and USDA classification could not be determined. Unextracted residues ranged from 3.1-20.7% of applied radioactivity. Half-lives calculated using a subset of data for clay and loam soils.
Solid-water distribution coefficient (Kd)	Average K_d in L/kg at 20°C: 0.44, loamy sand, pH 4.4 0.83, loam sand II, pH 6.2 0.28, silt loam, pH 6.6 0.28, clay, pH 7.5 2.36, sandy loam sediment, pH 5.6	MRID 44651884	Acceptable	
Freundlich solid-water distribution coefficient (KF)	K_F in L/kg (1/n) at 20°C: 0.40 (0.91), loamy sand, pH 4.4 0.79 (1.0), loam sand II, pH 6.2 0.26 (0.94), silt loam, pH 6.6 0.19 (0.82), clay, pH 7.5 1.81 (0.86), sandy loam sediment, pH 5.6	MRID 44651884	Acceptable	Freundlich exponents indicate that sorption was dependent on concentration in some soils.
Organic-carbon normalized distribution coefficient (KOC)	Average K_{OC} in L/kg OC at 20°C: 177, loamy sand, pH 4.4 56, loam sand II, pH 6.2 64, silt loam, pH 6.6 34, clay, pH 7.5 94, sandy loam sediment, pH 5.6	MRID 44651884	Acceptable	None

Appendix B. Aquatic Modeling Information and Output Files

Table B1. Characteristics of PRZM/EXAMS Scenarios Used to Estimate Concentrations of Acetamiprid, IM-1-4, and Unextractred Residues in the Aquatic Environment.1

Modeling Scenario	Location of Meteorologica l File	Soil	Hydrologic Group of Soil (SCS Curve Number)	Crop Present (MM/Day – MM/Day)	Months with Highest Precipitation2	Application Dates Modeled (MM/Day)
CAcitrus_WirrigSTD.txt	Fresno County, CA	Exeter loam	C (84, 79, 82)	01/01 – 01/02	January - March	01/01
CAcotton_WirrigSTD.txt	Fresno County, CA	Twisselman clay	C (89, 86, 87)	05/01 – 09/20	January – March (May when crop is present)	05/01
CAgrapes_WirrigSTD.txt	Southern San Joaquin Valley, CA	San Joaquin loam	C (84, 79, 82)	02/01 – 08/31	January (February for period when crop is present)	02/01
CAlettuceSTD.txt	Santa Maria, CA	Plecentia sandy loam	D (94, 89, 94)	02/16 – 05/12	February	02/16
CAonion_WirrigSTD.txt	Bakersfield, CA	Ciervo Clay	D (92, 85, 86)	01/16 – 06/15	January - March	01/16
CAalmond_WirrigSTD.txt	San Joaquin County, CA	Manteca fine sandy loam	C (84, 79, 82)	01/16 – 09/13	January	01/16
CAfruit_WirrigSTD.txt	Fresno County, CA	Exeter loam	C (84, 79, 82)	01/16 – 08/01	January - March	01/16
CAtomato_wirrigSTD.txt	Fresno, CA	Stockton Clay	D (91, 87, 88)	03/01 – 07/01	January - March	03/01
FLcabbageSTD.txt	Tampa, FL	Riviera Sand	C (91, 87, 88)	10/16 – 02/15	August (February while crop is present)	02/01
FLcitrusSTD.txt	West Palm Beach, FL	Wabasso fine sand	D (87, 85, 86)	01/01 – 12/31	September	10/01
FLcucumberSTD.txt	West Palm Beach, FL	Riviera Sand	C (91, 87, 88)	10/16 – 12/10	September (October when crop is present)	09/01
FLpeppersSTD.txt	West Palm Beach, FL	Riviera Sand	C (91, 87, 88)	09/01 – 12/01	September	09/01
FLstrawberry_wirrigSTD.txt	Tampa, FL	Myakka sand	D (92, 89, 90)	10/01 – 02/15	August (February while crop is present)	02/01
FLtomatoSTD_v2.txt	West Palm Beach, FL	Riviera Sand	C (91, 87, 88)	02/01 – 05/15	September (March while crop is present)	03/01
FLturfSTD.txt	Daytona Beach, FL	Adamsville Sand	C (74, 74, 74)	02/01 – 12/15	September	09/01
GAonionSTD.txt	Savannah, GA	Clarendon loamy sand	C (91, 86, 87)	09/15 – 06/15	August (September while crop is present)	09/15
GApeachsSTD.txt	Macon, GA	Greenville fine sandy loam	B (78, 67, 74)	03/01 – 08/31	July	07/01
GApecansSTD.txt	Tallahassee, FL	Williston loamy find sand	C (84, 79, 82)	04/16 – 10/01	June	06/01

Modeling Scenario	Location of Meteorologica l File	Soil	Hydrologic Group of Soil (SCS Curve Number)	Crop Present (MM/Day – MM/Day)	Months with Highest Precipitation2	Application Dates Modeled (MM/Day)
IDpotato_wirrigSTD.txt	Pocatello, ID	Malm	C (89, 86, 87)	06/01 – 09/15	May (June when crop is present)	06/01
ILCornSTD.txt	Peoria, IL	Adair clay loam	C (91, 87, 88)	05/01 – 09/21	May	05/01
MEpotatoSTD.txt	Caribou, ME	Conant silt loam	C (89, 86, 87)	06/01 – 10/01	November (June when crop is present)	06/01
MIasparagusSTDv2.txt	Muskegon, MI	Spinks loamy sand	A (71, 61, 66)	06/16 – 03/15	September	09/01
MIbeansSTD.txt	Flint, MI	Toledo silty clay loam	D (92, 89, 90)	06/01 – 09/04	September	09/01
MIcherriesSTD.txt	Traverse City, MI	Kewaunee silt loam	C (84, 79, 82)	05/01 – 07/21	September (June when crop is present)	06/01
MImelonSTD.txt	Detroit, MI	Selfridge loamy sand	B (86, 79, 86)	04/30 – 06/25	September (June when crop is present)	06/01
MIcottonSTD.txt	Jackson, MI	Loring silt loam	C (89, 86, 87)	05/01 – 09/22	July	07/01
MOmelonSTD.txt	Memphis, TN	Dubbs loamy sand	B (86, 81, 86)	04/10 – 07/31	December (April when crop is present)	04/10
MScornSTD.txt	Jackson, MS	Grenada silt loam	C (91, 87, 88)	04/10 – 08/22	December (April when crop is present)	04/10
MScottonSTD.txt	Little Rock, AR	Loring silt loam	C (99, 93, 32)	05/01 – 09/22	November (May when crop is present)	05/01
MSsoybeansSTD.txt	Yazzo County, MS	Loring Silt Loam	C (87, 84, 86)	04/16 – 10/10	November - May	04/16
NCappleSTD.txt	Asheville, NC	Hayesville loam	C (84, 79, 82)	04/01 – 10/25	June	06/01
NCcornESTD.txt	Raleigh, NC	Craven silt loam	C (89, 86, 87)	04/15 – 09/12	June	06/01
NCcottonSTD.txt	Raleigh, NC	Boswell fine sandy loam	D (92, 89, 90)	06/01 – 11/01	June	06/01
NCsweetpotatoSTD.txt	Raleigh, NC	Craven silt loam	C (89, 86, 87)	05/15 – 09/22	June	06/01
NCtobaccoSTD.txt	Raleigh, NC	Norfolk loamy sand	B (84, 79, 83)	04/16 – 07/16	June	06/01
OHcornSTD.txt	Vandalia, OH	Cardington silt loam	C (91, 87, 88)	05/01 – 10/25	May	05/01
NJmelonSTD.txt	Wilmington, DE	Sassafras loamy sand	B (86, 79, 86)	05/01 – 06/30	July	07/01
NYgrapesSTD.txt	Erie, PA	Lordstown channery silt loam	C (84, 79, 82)	06/01 – 10/15	September	09/01
ORappleSTD.txt	Salem, OR	Cornelis silt loam	C (84, 79, 82)	04/01 – 10/31	December (October when crop is present)	10/01
ORberriesSTD.txt	Salem, OR	Woodburn silt loam	C (84, 79, 82)	04/07 – 07/30	December (April when crop is present	04/07
ORfilbertSTD.txt	Salem, OR	Cornelius silt loam	C (84, 79, 82)	03/01- 11/10	December (November when crop is present)	11/09
ORmintSTD.txt	Salem, OR	Newburg fine sandy	C (84, 79, 82)	04/15 – 08/01	December (April when crop is present)	04/15

Modeling Scenario	Location of Meteorologica l File	Soil	Hydrologic Group of Soil (SCS Curve Number)	Crop Present (MM/Day – MM/Day)	Months with Highest Precipitation2	Application Dates Modeled (MM/Day)
		loam				
PAappleSTD_v2.st d	Harrisburg, PA	Elioak silt loam	C (84, 79, 82)	04/16 – 10/15	July	07/01
PAcornSTD.txt	Harrisburg, PA	Hagerstown silt loam	C (89, 83, 85)	04/16 – 10/01	July	07/01
PAtomatoSTD.txt	Harrisburg, PA	Glenville silt loam	C (87, 83, 85)	04/16 – 10/15	May	05/01
PAturfSTD.txt	Harrisburg, PA	Glenville silt loam	C (74, 74, 74)	04/01 – 11/01	June	06/01

1- Information on the scenarios was obtained from *Pesticide Root Zone Model Field and Orchard Crop Scenario Metadata* (April 5, 2006) and Metatdata files for RLF Scenarios.

Weather data collected from U.S. Weather. Average temperatures and rainfall in U.S. cities. (http://countrystudies.us/united-states/weather/) or The weather channel (http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0406)

Table B2. Representative Commodities and List of Commodities Associated with Each Proposed Food Use.

Use Site Listed on Label	Representative Commodities[1]	Commodities[1]
Leafy Vegetables within Crop Group 4	Celery, head lettuce, leaf lettuce, and spinach	Amaranth (Chinese spinach); arugula (roquette); cardoon; celery; celery, Chinese; celtuce; chervil; chrysanthemum, edible-leaved; chrysanthemum, garland; corn salad; cress, garden; cress, upland; dandelion; dock (sorrel); endive (escarole); fennel, Florence; lettuce, head and leaf; orach; parsley; purslane, garden; purslane, winter; radicchio (red chicory); rhubarb; spinach; spinach, New Zealand; spinach, vine; Swiss chard
Head and Stem Cole Crops	Broccoli or cauliflower and cabbage	Broccoli; broccoli, Chinese; brussels sprouts; cabbage; cabbage, Chinese (napa); cabbage, Chinese mustard; cauliflower; cavalo broccolo; kohlrabi
Leafy Cole Crops (within Crop Subgroup 5B) and Turnip Greens	Mustard greens	Broccoli raab; cabbage, Chinese (bok choy); collards; kale; mizuna; mustard greens; mustard spinach; rape greens
Fruiting Vegetables (within Crop Group 8-10)	Tomato, standard size, and one cultivar of small tomato; bell pepper and one cultivar of small nonbell pepper	African eggplant; bush tomato; bell pepper; cocona; currant tomato; eggplant; garden huckleberry; goji berry; groundcherry; martynia; naranjilla; okra; pea eggplant; pepino; nonbell pepper; roselle; scarlet eggplant; sunberry; tomatillo; tomato; tree tomato; cultivars, varieties, and/or hybrids of these
Tuberous and Corm Vegetables (within Crop Sub-group 1C)	Potato	Arracacha; arrowroot; artichoke, Chinese; artichoke, Jerusalem; canna, edible; cassava, bitter and sweet; chayote (root); chufa; dasheen (taro); ginger; leren; potato; sweet potato; tanier; turmeric; yam bean; yam, true

Use Site Listed on Label	Representative Commodities[1]	Commodities[1]
Grapes and Other Climbing Small Fruits (except Fuzzy Kiwifruit, within Crop Sub-group 13-07F)	Grape	Amur river grape; gooseberry; grape; hardy; maypop; schisandra berry; cultivars, varieties, and/or hybrids of these
Stone Fruit (within crop Group 12)	Sweet or tart cherry, peach, and plum or fresh prune	Apricot; cherry, sweet; cherry, tart; nectarine; peach; plum; plum, Chickasaw; plum, Damson; plum, Japanese; plumcot; prune (fresh)
Cucurbits (within Crop Group 9)	Melon, muskmelon, squash, summer squash	Muskmelon, including hybrids and/or varieties of Cucumis melo (including true cantaloupe, cantaloupe, casaba, Santa Claus melon, crenshaw melon, honeydew melon, honey balls, Persian melon, golden pershaw melon, mango melon, pineapple melon, snake melon); and watermelon, including hybrids and/or varieties of (Citrullus spp.). Cucumis melo (includes true cantaloupe, cantaloupe, casaba, Santa Claus melon, crenshaw melon, honeydew melon, honey balls, Persian melon, golden pershaw melon, mango melon, pineapple melon, snake melon, and other varieties and/or hybrids of these.). Pumpkin, summer squash, and winter squash. Fruits of the gourd (Cucurbitaceae) family that are consumed when immature, 100% of the fruit is edible either cooked or raw, once picked it cannot be stored, has a soft rind which is easily penetrated, and if seeds were harvested they would not germinate; e.g., Cucurbita pepo (i.e., crookneck squash, straightneck squash, scallop squash, and vegetable marrow); Lagenaria spp. (i.e., spaghetti squash, hyotan, cucuzza); Luffa spp. (i.e., hechima, Chinese okra); Momordica spp. (i.e., bitter melon, balsam pear, balsam apple, Chinese cucumber); Sechium edule (chayote); and other cultivars and/or hybrids of these.
Tree Nuts (within Crop Group 14, including Pistachio)	Almond and pecan	Almond; beech nut; Brazil nut; butternut; cashew; chestnut; chinquapin; filbert (hazelnut); hickory nut; macadamia nut; pecan; walnut, black and English
Edible Podded Legume (within Crop Subgroup-6A) and Succulent Shelled Peas and Beans (within Crop Sub-Group 6B)	Any succulent shelled cultivar of bean (Phaseolus) and garden pea (Pisum)	Bean (Phaseolus) (includes lima bean, green; broad bean, succulent); bean (Vigna) (includes blackeyed pea, cowpea, southern pea); pea (Pisum) (includes English pea, garden pea, green pea); pigeon pea
Strawberries and Other Low Growing Berries (within Crop Sub-group 13-07G)	Strawberry	Bearberry; bilberry; blueberry, lowbush; cloudberry; cranberry; lingonberry; muntries; partridgeberry; strawberry; cultivars, varieties, and/or hybrids of these
Blueberries and Other Bush Berries (within Crop Sub-Group 13-07B) and Cane Berries (within Crop Sub-group 13-07A)	Any one blackberry or any one raspberry	Blackberry; loganberry; raspberry, black and red; wild raspberry; cultivars, varieties, and/or hybrids of these

Use Site Listed on Label	Representative Commodities[1]	Commodities[1]
Onions and Other Bulb Vegetables (within Crop Group 3-07)	Onion, bulb onion, green onion, garlic	Bulb onion; green onion; and garlic. Bulb onion; garlic; great headed garlic; serpent garlic; Chinese onion; pearl onion; potato onion; and shallot, bulb. Green onion; lady's leek; leek; wild leek; Beltsville bunching onion; fresh onion; tree onion, tops; Welsh onion; and shallot, fresh leaves. Garlic, great headed; garlic, and serpent garlic.
Citrus (within Crop Group 10-10)	Orange or tangerine/mandarin, lemon or lime, and grapefruit	Australian desert lime; Australian finger-lime; Australian round lime; Brown River finger lime; calamondin; citron; citrus hybrids; grapefruit; Japanese summer grapefruit; kumquat; lemon; lime; Mediterranean mandarin; mount white lime; New Guinea wild lime; orange, sour; orange, sweet; pummelo; Russell River lime; satsuma mandarin; sweet lime; tachibana orange; Tahiti lime; tangelo; tangerine (mandarin); tangor; trifoliate orange; uniq fruit; cultivars, varieties, and/or hybrids of these
Pome Fruit (within Crop Group 11-10)	Apple and pear	Apple; azarole; crabapple; loquat; mayhaw; medlar; pear; pear, Asian; quince; quince, Chinese; quince, Japanese; tejocote; cultivars, varieties, and/or hybrids of these
Sweet Corn	Sweet corn	

2- [1] Information obtained from the IR-4 Project. Index of Crops/Crop Groups/ Crop Subgroups, and Crop Definitions. December 8, 2010. Available at: http://ir4.rutgers.edu/other/CropGroup.htm (accessed October 18, 2011).

GENEEC Output

```
RUN No.   1 FOR acetamiprid      ON   cotton        * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)    (FT)     (IN)
--------------------------------------------------------------------
.100(    .393)   4    7     227.0 4250.0   AERL_B( 13.0)     .0     .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2          N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC       AVG GEEC      AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
    17.83        17.80         17.63         17.24         16.96

RUN No.   2 FOR acetamiprid      ON   leafy veg     * INPUT VALUES *
```

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.075(.366)	5	7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
16.63	16.60	16.44	16.08	15.82

RUN No. 3 FOR acetamiprid ON cole * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.393)	4	7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
17.83	17.80	17.63	17.24	16.96

RUN No. 4 FOR acetamiprid ON fruit * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.075(.294)	4	7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
13.37	13.35	13.22	12.93	12.72

RUN No. 5 FOR acetamiprid ON citrus * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.110(.536)	5 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
24.39	24.35	24.11	23.58	23.20

RUN No. 6 FOR acetamiprid ON citrus * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.110(.536)	5 7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC	DAYS UNTIL	HYDROLYSIS	PHOTOLYSIS	METABOLIC	COMBINED

```
 (FIELD)   RAIN/RUNOFF   (POND)       (POND-EFF)     (POND)       (POND)
--------------------------------------------------------------------------
 383.00         2          N/A     34.00- 4216.00   ******    1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------------
   PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
   GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------------
   23.29        23.25          23.02         22.50         22.12

RUN No.   7 FOR acetamiprid      ON   citrus         * INPUT VALUES *
--------------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)    (FT)     (IN)
--------------------------------------------------------------------------
.110(   .536)   5   7      227.0 4250.0   ORCHAR(  9.7)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)       (POND-EFF)     (POND)       (POND)
--------------------------------------------------------------------------
 383.00         2          N/A     34.00- 4216.00   ******    1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------------
   PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
   GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------------
   24.23        24.19          23.95         23.42         23.03

RUN No.   8 FOR acetamiprid      ON   leafy          * INPUT VALUES *
--------------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)    (FT)     (IN)
--------------------------------------------------------------------------
.075(   .366)   5   7      227.0 4250.0   GRHIFI(  6.6)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)       (POND-EFF)     (POND)       (POND)
--------------------------------------------------------------------------
 383.00         2          N/A     34.00- 4216.00   ******    1344.49
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GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
15.88	15.85	15.69	15.34	15.08

RUN No. 9 FOR acetamiprid ON cole * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.393)	4	7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
17.04	17.01	16.84	16.46	16.18

RUN No. 10 FOR acetamiprid ON corm * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.075(.294)	4	7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC

```
    12.78        12.76          12.63         12.35          12.14

RUN No.  11 FOR acetamiprid      ON   grapes         * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.100(   .197)   2  14      227.0 4250.0   AERL_B( 13.0)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2          N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
     8.96         8.95          8.86          8.67          8.53

RUN No.  12 FOR acetamiprid      ON   stone          * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.150(   .584)   4  10      227.0 4250.0   AERL_B( 13.0)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2          N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
    26.56        26.52         26.26         25.69         25.27

RUN No.  13 FOR acetamiprid      ON   stone          * INPUT VALUES *
--------------------------------------------------------------------
```

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.150(.584)	4 10	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
25.37	25.32	25.07	24.51	24.10

RUN No. 14 FOR acetamiprid ON stone * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.150(.584)	4 10	227.0	4250.0	ORCHAR(9.7)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
26.39	26.35	26.09	25.51	25.09

RUN No. 15 FOR acetamiprid ON cucurbits * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.491)	5 5	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
22.31	22.27	22.05	21.57	21.22

RUN No. 16 FOR acetamiprid ON tree * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.180(.693)	4 14	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
30.14	30.09	29.79	29.12	28.63

RUN No. 17 FOR acetamiprid ON tree * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.180(.693)	4 14	227.0	4250.0	ORCHAR(9.7)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)

383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
31.37	31.32	31.01	30.32	29.82

RUN No. 18 FOR acetamiprid ON legume * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.296)	3 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
13.45	13.42	13.29	13.00	12.79

RUN No. 19 FOR acetamiprid ON legume * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.296)	3 7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

```
-------------------------------------------------------------------
    PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
-------------------------------------------------------------------
    12.85        12.83         12.70         12.42         12.21

RUN No.  19 FOR acetamiprid      ON   strawberri    * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &    SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL     Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.130(   .258)   2   7      227.0 4250.0   AERL_B( 13.0)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)     (POND)     (POND)
--------------------------------------------------------------------
 383.00        2           N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
    11.72        11.70         11.58         11.33         11.15

RUN No.  20 FOR acetamiprid      ON   straw         * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &    SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL     Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.130(   .258)   2   7      227.0 4250.0   GRHIFI(  6.6)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)     (POND)     (POND)
--------------------------------------------------------------------
 383.00        2           N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
    11.20        11.18         11.07         10.82         10.64
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RUN No.  21 FOR acetamiprid       ON   blue           * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.085(   .414)   5   7     227.0 4250.0   AERL_B( 13.0)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00         2           N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))      Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK        MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC        AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
    18.84        18.81          18.63         18.22          17.93

RUN No.  22 FOR acetamiprid       ON   blue           * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.085(   .414)   5   7     227.0 4250.0   GRHIFI(  6.6)      .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00         2           N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))      Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK        MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC        AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
    18.00        17.97          17.79         17.39          17.10

RUN No.  23 FOR acetamiprid       ON   blue           * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
```

ONE(MULT)	INTERVAL	Koc	(PPM)	(%DRIFT)	(FT)	(IN)
.085(.414)	5 7	227.0	4250.0	ORCHAR(9.7)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
18.72	18.69	18.51	18.10	17.80

RUN No. 24 FOR acetamiprid ON onion * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.180(.659)	4 14	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
159.00	2	N/A	34.00- 4216.00	645.00	559.42

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
30.08	30.01	29.62	28.76	28.13

RUN No. 25 FOR acetamiprid ON tree * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.180(.188)	4 14	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
3.10	2	N/A	34.00- 4216.00	75.00	73.69

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
9.23	9.17	8.73	7.82	7.21

RUN No. 26 FOR acetamiprid ON onion * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY ZONE(FT)	INCORP (IN)
.150(.589)	4 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
4.13	3.92	2.83	1.57	1.13

RUN No. 27 FOR acetamiprid ON onion * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.150(.589)	4 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)

383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
26.75	26.70	26.44	25.87	25.44

RUN No. 28 FOR acetamiprid ON onion * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.150(.589)	4 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
26.75	26.70	26.44	25.87	25.44

RUN No. 29 FOR acetamiprid ON clover * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.075(.075)	1 1	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

```
     PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
     GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
 ----------------------------------------------------------------------
      3.40         3.39          3.36          3.29          3.23


RUN No.  30 FOR acetamiprid       ON    asparagus      * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)    (FT)     (IN)
--------------------------------------------------------------------
.100(   .198)   2  10     227.0 4250.0   AERL_B( 13.0)     .0     .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2           N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
     PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
     GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
 ----------------------------------------------------------------------
      8.99         8.98          8.89          8.70          8.55


RUN No.  31 FOR acetamiprid       ON    asparaugs      * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)    (FT)     (IN)
--------------------------------------------------------------------
.100(   .198)   2  10     227.0 4250.0   GRHIFI(  6.6)     .0     .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2           N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
     PEAK       MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
     GEEC       AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
 ----------------------------------------------------------------------
      8.60         8.58          8.50          8.31          8.17
```

RUN No. 32 FOR acetamiprid ON corn * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.199)	2 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
9.01	9.00	8.91	8.72	8.57

RUN No. 33 FOR acetamiprid ON pome * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.150(.581)	4 12	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
26.44	26.40	26.14	25.57	25.15

RUN No. 34 FOR acetamiprid ON soybean * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)

```
--------------------------------------------------------------------
.040(    .079)   2   7      227.0 4250.0   AERL_B(  3.7)  150.0     .0


FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2          N/A      34.00- 4216.00   ******   1344.49


GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK        MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC        AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
     3.19         3.19          3.15          3.08          3.03


RUN No.  35 FOR acetamiprid      ON   soybean       * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.040(    .079)   2   7      227.0 4250.0   GRHIFI(  2.7)   25.0     .0


FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00        2          N/A      34.00- 4216.00   ******   1344.49


GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK        MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC        AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
     3.27         3.27          3.23          3.16          3.11


RUN No.   1 FOR acetamiprid      ON   tree nut      * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)     (IN)
--------------------------------------------------------------------
.180(    .693)   4  14      227.0 4250.0   AERL_B( 13.0)     .0     .0


FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
```

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
31.58	31.53	31.22	30.54	30.05

RUN No. 1 FOR acetamiprid ON cotton * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.010(.039)	4	7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
1.70	1.70	1.68	1.65	1.62

RUN No. 2 FOR acetamiprid ON corm * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.075(.294)	4	7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
12.78	12.76	12.63	12.35	12.14

RUN No. 3 FOR acetamiprid ON cotton * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.393)	4 7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
17.04	17.01	16.84	16.46	16.18

RUN No. 4 FOR acetamiprid ON grapes * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.197)	2 14	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK	MAX 4 DAY	MAX 21 DAY	MAX 60 DAY	MAX 90 DAY

```
    GEEC      AVG GEEC       AVG GEEC      AVG GEEC       AVG GEEC
--------------------------------------------------------------------
     8.57        8.55          8.47          8.28           8.14

RUN No.   5 FOR acetamiprd       ON   grapes        * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)      (IN)
--------------------------------------------------------------------
.100(   .197)   2  14      227.0 4250.0   ORCHAR(  9.7)     .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00         2          N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK      MAX 4 DAY     MAX 21 DAY    MAX 60 DAY     MAX 90 DAY
    GEEC      AVG GEEC       AVG GEEC      AVG GEEC       AVG GEEC
--------------------------------------------------------------------
     8.91        8.90          8.81          8.61           8.47

RUN No.   6 FOR acetamiprid      ON   cucumbers     * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)      (IN)
--------------------------------------------------------------------
.100(   .491)   5   5      227.0 4250.0   GRHIFI(  6.6)     .0    .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)     (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------
 383.00         2          N/A     34.00- 4216.00   ******   1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
    PEAK      MAX 4 DAY     MAX 21 DAY    MAX 60 DAY     MAX 90 DAY
    GEEC      AVG GEEC       AVG GEEC      AVG GEEC       AVG GEEC
--------------------------------------------------------------------
    21.31       21.28         21.06         20.59          20.25
```

RUN No. 7 FOR acetamiprid ON asparagus * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.075(.075)	1	1	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
3.25	3.25	3.21	3.14	3.09

RUN No. 8 FOR corn ON corn * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.100(.393)	4	7	227.0	4250.0	GRHIFI(6.6)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
17.04	17.01	16.84	16.46	16.18

RUN No. 9 FOR acetamiprid ON pome * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)

```
.150(    .581)   4   12      227.0 4250.0   GRHIFI(  6.6)      .0     .0


FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)      (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------------
 383.00         2           N/A      34.00- 4216.00   ******   1344.49


GENERIC EECs (IN MICROGRAMS/LITER (PPB))      Version 2.0 Aug 1, 2001
--------------------------------------------------------------------------
    PEAK        MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC        AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------------
    25.24        25.20          24.94         24.39         23.98


RUN No.  10 FOR acetamiprid      ON   pome          * INPUT VALUES *
--------------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)      (IN)
--------------------------------------------------------------------------
.150(    .581)   4   12      227.0 4250.0   ORCHAR(  9.7)      .0     .0


FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS   PHOTOLYSIS   METABOLIC  COMBINED
 (FIELD)   RAIN/RUNOFF   (POND)      (POND-EFF)    (POND)     (POND)
--------------------------------------------------------------------------
 383.00         2           N/A      34.00- 4216.00   ******   1344.49


GENERIC EECs (IN MICROGRAMS/LITER (PPB))      Version 2.0 Aug 1, 2001
--------------------------------------------------------------------------
    PEAK        MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
    GEEC        AVG GEEC       AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------------
    26.27        26.22          25.96         25.39         24.97


RUN No.   1 FOR acetamiprid      ON   air           * INPUT VALUES *
--------------------------------------------------------------------------
 RATE (#/AC)    No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)     INTERVAL    Koc   (PPM )    (%DRIFT)   (FT)      (IN)
--------------------------------------------------------------------------
.020(    .040)   2    7      227.0 4250.0   AERL_B( 13.0)      .0     .0


FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------------
```

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
1.80	1.80	1.78	1.74	1.71

RUN No. 1 FOR acetamiprid ON bait * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.082(1.850)	24	3	227.0	4250.0	GRANUL(.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
74.12	73.98	73.21	71.53	70.29

RUN No. 2 FOR acetamiprid ON bait * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL		SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.082(.082)	1	1	227.0	4250.0	GRANUL(.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
3.28	3.28	3.24	3.17	3.12

RUN No. 3 FOR acetamiprid ON bait * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.020(.020)	1 1	227.0	4250.0	GRANUL(.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN NANOGRAMS/LITER (PPTr)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
801.20	799.71	791.43	773.17	759.82

RUN No. 4 FOR acetamiprid ON bait * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.040(.040)	1 1	227.0	4250.0	GRANUL(.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC

1.60	1.60	1.58	1.55	1.52

RUN No. 5 FOR acetamiprid ON air * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Koc	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY (FT)	INCORP (IN)
.010(.020)	2 7	227.0	4250.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
383.00	2	N/A	34.00- 4216.00	******	1344.49

GENERIC EECs (IN NANOGRAMS/LITER (PPTr)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
901.37	899.88	891.08	871.64	857.41

Example PRZM/ EXAMs Output

Parent Alone - Cucurbits

stored as pFLcucair.out
Chemical: acetamiprid
PRZM environment: FLcucumberSTD.txt modified Wedday, 13 June 2007 at 12:19:24
EXAMS environment: pond298.exv modified Tueday, 26 August 2008 at 06:14:08
Metfile: w12844.dvf modified Tueday, 26 August 2008 at 06:14:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.645	1.597	1.462	1.219	1.077	0.3169
1962	7.047	6.841	6.243	5.066	4.493	1.471
1963	5.301	5.204	4.86	4.146	3.756	2.106
1964	5.293	5.146	4.693	3.927	3.508	1.874

1965	2.124	2.102	2.012	1.821	1.684	1.155
1966	5.87	5.711	5.205	4.519	4.064	1.548
1967	4.178	4.069	3.957	3.367	3.004	1.729
1968	3.669	3.609	3.397	2.89	2.635	1.491
1969	5.616	5.464	5.068	4.276	3.834	1.76
1970	3.337	3.247	3.005	2.558	2.315	1.579
1971	2.93	2.851	2.73	2.336	2.075	1.144
1972	1.86	1.811	1.67	1.416	1.25	0.7659
1973	2.9	2.827	2.624	2.213	1.965	0.8308
1974	2.603	2.543	2.351	2.025	1.843	0.9381
1975	5.9	5.747	5.514	4.565	4.036	1.525
1976	4.777	4.654	4.388	3.724	3.315	1.844
1977	8.793	8.569	7.815	7.103	6.392	2.653
1978	3.63	3.597	3.461	3.192	2.993	1.887
1979	9.216	9.012	8.192	6.96	6.181	2.216
1980	4.38	4.265	4.023	3.343	3.019	2.238
1981	4.941	4.808	4.309	3.529	3.166	1.616
1982	2.531	2.473	2.274	1.916	1.726	1.198
1983	4.778	4.642	4.17	3.422	3.039	1.249
1984	3.704	3.612	3.373	2.84	2.529	1.422
1985	5.043	4.904	4.59	3.78	3.315	1.511
1986	2.157	2.098	1.896	1.684	1.562	1.137
1987	4.608	4.476	4.144	3.451	3.094	1.203
1988	1.89	1.868	1.783	1.615	1.502	1.008
1989	2.237	2.184	2.068	1.723	1.529	0.6935
1990	4.355	4.271	4.091	3.361	2.952	1.155

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258	9.216	9.012	8.192	7.103	6.392	2.653
0.064516	8.793	8.569	7.815	6.96	6.181	2.238
0.096774	7.047	6.841	6.243	5.066	4.493	2.216
0.129032	5.9	5.747	5.514	4.565	4.064	2.106
0.16129	5.87	5.711	5.205	4.519	4.036	1.887
0.193548	5.616	5.464	5.068	4.276	3.834	1.874
0.225806	5.301	5.204	4.86	4.146	3.756	1.844
0.258065	5.293	5.146	4.693	3.927	3.508	1.76
0.290323	5.043	4.904	4.59	3.78	3.315	1.729
0.322581	4.941	4.808	4.388	3.724	3.315	1.616
0.354839	4.778	4.654	4.309	3.529	3.166	1.579
0.387097	4.777	4.642	4.17	3.451	3.094	1.548
0.419355	4.608	4.476	4.144	3.422	3.039	1.525
0.451613	4.38	4.271	4.091	3.367	3.019	1.511

0.483871	4.355	4.265	4.023	3.361	3.004	1.491
0.516129	4.178	4.069	3.957	3.343	2.993	1.471
0.548387	3.704	3.612	3.461	3.192	2.952	1.422
0.580645	3.669	3.609	3.397	2.89	2.635	1.249
0.612903	3.63	3.597	3.373	2.84	2.529	1.203
0.645161	3.337	3.247	3.005	2.558	2.315	1.198
0.677419	2.93	2.851	2.73	2.336	2.075	1.155
0.709677	2.9	2.827	2.624	2.213	1.965	1.155
0.741935	2.603	2.543	2.351	2.025	1.843	1.144
0.774194	2.531	2.473	2.274	1.916	1.726	1.137
0.806452	2.237	2.184	2.068	1.821	1.684	1.008
0.83871	2.157	2.102	2.012	1.723	1.562	0.9381
0.870968	2.124	2.098	1.896	1.684	1.529	0.8308
0.903226	1.89	1.868	1.783	1.615	1.502	0.7659
0.935484	1.86	1.811	1.67	1.416	1.25	0.6935
0.967742	1.645	1.597	1.462	1.219	1.077	0.3169
0.1	6.9323	6.7316	6.1701	5.0159	4.4501	2.205
					Average of yearly averages :	1.44214

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:

Output File: pFLcucair

Metfile:	w12844.dvf			
PRZM scenario:	FLcucumberSTD.txt			
EXAMS environment file:	pond298.exv			
Chemical Name:	acetamiprid			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	222.68	g/mol	
Henry's Law Const.	henry	5.20E-14	atm-m^3/mol	
Vapor Pressure	vapr	7.50E-10	torr	
Solubility	sol	4250	mg/L	

Kd	Kd		mg/L	
Koc	Koc	227	mg/L	
Photolysis half-life	kdp	34	days	Half-life
Aerobic Aquatic Metabolism	kbacw	75	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	975	days	Halfife
Aerobic Soil Metabolism	asm	3.1	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.11	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	9-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.11	kg/ha	
Interval 2	interval	5	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.11	kg/ha	
Interval 3	interval	5	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.11	kg/ha	
Interval 4	interval	5	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.11	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

Parent+IM-1-4 - Cucurbits

stored as p14FLcucair.out

Chemical: acetamiprid
PRZM environment: FLcucumber STD.txt modified Wedday, 13 June 2007 at 12:19:24
EXAMS environment: pond298.exv modified Tueday, 26 August 2008 at 06:14:08
Metfile: w12844.dvf modified Tueday, 26 August 2008 at 06:14:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	3.846	3.815	3.727	3.592	3.498	1.03
1962	17.51	17.33	16.89	15.88	15.29	6.26
1963	21.27	21.18	20.75	19.89	19.48	14.01
1964	26.71	26.54	26.15	25.61	25.06	18.59
1965	26.24	26.12	25.71	24.89	24.08	21.28
1966	27.43	27.3	26.94	26.38	25.92	22.34
1967	30.23	30.13	29.57	28.68	28.12	23.41
1968	32.06	31.93	31.46	30.48	29.87	25.27
1969	34.78	34.68	34.19	33.09	32.39	27.11
1970	31.99	31.88	31.57	30.64	30.1	27.84
1971	28.26	28.21	28.01	27.58	27.27	25.69
1972	25.19	25.14	24.92	24.49	24.19	22.5
1973	24.29	24.22	23.91	23.32	22.99	21.06
1974	23.98	23.87	23.48	22.77	22.39	20.04
1975	32.43	32.28	31.69	30.58	29.82	21.83
1976	30.63	30.51	30.13	29.7	29.38	25.71
1977	35.62	35.47	34.89	33.72	33.03	27.38
1978	30.78	30.73	30.51	30.07	29.74	27.46
1979	37.63	37.42	36.98	35.76	34.98	26.88
1980	32.16	32.1	31.85	31.34	30.97	28.97
1981	33.11	32.95	32.29	31.45	30.96	26.84
1982	30.27	30.16	29.66	28.95	28.42	26.37
1983	33.21	33.02	32.43	31.22	30.51	25.59
1984	32.13	32.01	31.42	30.45	29.93	26.47
1985	35.16	34.98	34.25	33.26	32.53	27.05
1986	30.11	30.05	29.84	29.35	28.98	26.49
1987	31.3	31.12	30.62	29.59	28.96	23.93
1988	27.54	27.44	27	26.42	25.88	24.28
1989	24.74	24.68	24.46	24.01	23.69	22.15

1990	32.76	32.56	31.88	30.67	29.95	22.28

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258	37.63	37.42	36.98	35.76	34.98	28.97
0.064516	35.62	35.47	34.89	33.72	33.03	27.84
0.096774	35.16	34.98	34.25	33.26	32.53	27.46
0.129032	34.78	34.68	34.19	33.09	32.39	27.38
0.16129	33.21	33.02	32.43	31.45	30.97	27.11
0.193548	33.11	32.95	32.29	31.34	30.96	27.05
0.225806	32.76	32.56	31.88	31.22	30.51	26.88
0.258065	32.43	32.28	31.85	30.67	30.1	26.84
0.290323	32.16	32.1	31.69	30.64	29.95	26.49
0.322581	32.13	32.01	31.57	30.58	29.93	26.47
0.354839	32.06	31.93	31.46	30.48	29.87	26.37
0.387097	31.99	31.88	31.42	30.45	29.82	25.71
0.419355	31.3	31.12	30.62	30.07	29.74	25.69
0.451613	30.78	30.73	30.51	29.7	29.38	25.59
0.483871	30.63	30.51	30.13	29.59	28.98	25.27
0.516129	30.27	30.16	29.84	29.35	28.96	24.28
0.548387	30.23	30.13	29.66	28.95	28.42	23.93
0.580645	30.11	30.05	29.57	28.68	28.12	23.41
0.612903	28.26	28.21	28.01	27.58	27.27	22.5
0.645161	27.54	27.44	27	26.42	25.92	22.34
0.677419	27.43	27.3	26.94	26.38	25.88	22.28
0.709677	26.71	26.54	26.15	25.61	25.06	22.15
0.741935	26.24	26.12	25.71	24.89	24.19	21.83
0.774194	25.19	25.14	24.92	24.49	24.08	21.28
0.806452	24.74	24.68	24.46	24.01	23.69	21.06
0.83871	24.29	24.22	23.91	23.32	22.99	20.04
0.870968	23.98	23.87	23.48	22.77	22.39	18.59
0.903226	21.27	21.18	20.75	19.89	19.48	14.01
0.935484	17.51	17.33	16.89	15.88	15.29	6.26
0.967742	3.846	3.815	3.727	3.592	3.498	1.03
0.1	35.122	34.95	34.244	33.243	32.516	27.452
					Average of yearly averages :	22.8703 3

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:

Output File: p14FLcucair

Metfile:	w12844.dvf
PRZM scenario:	FLcucumberSTD.txt
EXAMS environment file:	pond298.exv
Chemical Name:	acetamiprid

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	222.68	g/mol	
Henry's Law Const.	henry	5.20E-14	atm-m^3/mol	
Vapor Pressure	vapr	7.50E-10	torr	
Solubility	sol	4250	mg/L	
Kd	Kd		mg/L	
Koc	Koc	227	mg/L	
Photolysis half-life	kdp	34	days	Half-life
Aerobic Aquatic Metabolism	kbacw	645	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1770	days	Halfife
Aerobic Soil Metabolism	asm	159	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.11	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	9-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.11	kg/ha	
Interval 2	interval	5	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.11	kg/ha	

Interval 3	interval	5	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.11	kg/ha	
Interval 4	interval	5	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.11	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

Parent+IM-1-4+Unextracted Residues - Cucurbit

stored as p14UFLcucG.out
Chemical: acetamiprid
PRZM environment:
FLcucumberSTD.txt modified Wedday, 13 June 2007 at 12:19:24
EXAMS environment:
pond298.exv modified Tueday, 26 August 2008 at 06:14:08
Metfile: w12844.dvf modified Tueday, 26 August 2008 at 06:14:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	3.196	3.174	3.125	3.012	2.935	0.8381
1962	17.35	17.21	16.88	16.06	15.58	6.173
1963	23.31	23.22	22.9	22.25	21.88	15.65
1964	31.49	31.41	31.05	30.66	30.25	22.72
1965	34.49	34.39	34.1	33.45	32.56	28.54
1966	37.8	37.7	37.49	37.19	36.86	32.48
1967	43.49	43.42	42.97	42.17	41.75	36.08
1968	47.8	47.7	47.31	46.49	45.99	40.47
1969	52.98	52.91	52.52	51.65	51.08	44.81
1970	52.63	52.55	52.27	51.56	51.1	48.06
1971	50.23	50.15	49.94	49.65	49.3	47.84
1972	48.96	48.88	48.55	47.71	47.32	46.02
1973	48.65	48.58	48.32	47.73	47.42	45.55
1974	48.55	48.46	48.11	47.45	47.08	44.8

1975	57.48	57.36	56.87	55.85	55.19	46.91
1976	56.96	56.85	56.55	56.01	55.8	51.87
1977	63.01	62.89	62.43	61.45	60.88	54.74
1978	58.97	58.92	58.72	58.32	58.03	56.15
1979	67.24	67.06	66.59	65.6	64.88	56.36
1980	62.45	62.39	62.16	61.69	61.36	59.75
1981	64.4	64.26	63.68	63.03	62.62	58.31
1982	62.36	62.26	61.82	61.17	60.71	58.55
1983	65.54	65.38	64.88	63.79	63.12	58.11
1984	64.81	64.71	64.18	63.31	62.83	59.35
1985	68.42	68.25	67.61	66.66	66.02	60.32
1986	63.83	63.78	63.58	63.11	62.75	60.29
1987	64.55	64.39	63.96	63.02	62.42	57.51
1988	60.86	60.77	60.36	59.88	59.5	57.82
1989	58.26	58.21	57.99	57.52	57.18	55.36
1990	65.19	65	64.38	63.21	62.56	54.86

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258	68.42	68.25	67.61	66.66	66.02	60.32
0.064516	67.24	67.06	66.59	65.6	64.88	60.29
0.096774	65.54	65.38	64.88	63.79	63.12	59.75
0.129032	65.19	65	64.38	63.31	62.83	59.35
0.16129	64.81	64.71	64.18	63.21	62.75	58.55
0.193548	64.55	64.39	63.96	63.11	62.62	58.31
0.225806	64.4	64.26	63.68	63.03	62.56	58.11
0.258065	63.83	63.78	63.58	63.02	62.42	57.82
0.290323	63.01	62.89	62.43	61.69	61.36	57.51
0.322581	62.45	62.39	62.16	61.45	60.88	56.36
0.354839	62.36	62.26	61.82	61.17	60.71	56.15
0.387097	60.86	60.77	60.36	59.88	59.5	55.36
0.419355	58.97	58.92	58.72	58.32	58.03	54.86
0.451613	58.26	58.21	57.99	57.52	57.18	54.74
0.483871	57.48	57.36	56.87	56.01	55.8	51.87
0.516129	56.96	56.85	56.55	55.85	55.19	48.06
0.548387	52.98	52.91	52.52	51.65	51.1	47.84
0.580645	52.63	52.55	52.27	51.56	51.08	46.91
0.612903	50.23	50.15	49.94	49.65	49.3	46.02
0.645161	48.96	48.88	48.55	47.73	47.42	45.55
0.677419	48.65	48.58	48.32	47.71	47.32	44.81
0.709677	48.55	48.46	48.11	47.45	47.08	44.8

0.741935	47.8	47.7	47.31	46.49	45.99	40.47
0.774194	43.49	43.42	42.97	42.17	41.75	36.08
0.806452	37.8	37.7	37.49	37.19	36.86	32.48
0.83871	34.49	34.39	34.1	33.45	32.56	28.54
0.870968	31.49	31.41	31.05	30.66	30.25	22.72
0.903226	23.31	23.22	22.9	22.25	21.88	15.65
0.935484	17.35	17.21	16.88	16.06	15.58	6.173
0.967742	3.196	3.174	3.125	3.012	2.935	0.8381
0.1	65.505	65.342	64.83	63.742	63.091	59.71
					Average of yearly averages:	45.54304

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:

Output File: p14UFLcucG

Metfile:	w12844.dvf
PRZM scenario:	FLcucumberSTD.txt
EXAMS environment file:	pond298.exv
Chemical Name:	acetamiprid

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	222.68	g/mol	
Henry's Law Const.	henry	5.20E-14	atm-m^3/mol	
Vapor Pressure	vapr	7.50E-10	torr	
Solubility	sol	4250	mg/L	
Kd	Kd		mg/L	
Koc	Koc	227	mg/L	
Photolysis half-life	kdp	34	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1974	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	4116	days	Halfife
Aerobic Soil Metabolism	asm	383	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	

Application Rate:	TAPP	0.11	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	9-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.11	kg/ha	
Interval 2	interval	5	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.11	kg/ha	
Interval 3	interval	5	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.11	kg/ha	
Interval 4	interval	5	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.11	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

```
                    SCIGROW
                  VERSION 2.3
      ENVIRONMENTAL FATE AND EFFECTS DIVISION
            OFFICE OF PESTICIDE PROGRAMS
        U.S. ENVIRONMENTAL PROTECTION AGENCY
                 SCREENING MODEL
           FOR AQUATIC PESTICIDE EXPOSURE

SciGrow version 2.3
chemical:acetamiprid
time is 10/14/2011  15:45:26
------------------------------------------------------------------------
 Application     Number of      Total Use    Koc      Soil Aerobic
 rate (lb/acre)  applications   (lb/acre/yr)  (ml/g)   metabolism (days)
------------------------------------------------------------------------
     0.200          4.0           0.800     2.51E+02       78.0
------------------------------------------------------------------------
groundwater screening cond (ppb) =   2.96E-01
************************************************************************

SciGrow version 2.3
chemical:acetamiprid
time is 10/14/2011  15:46:34
------------------------------------------------------------------------
 Application     Number of      Total Use    Koc      Soil Aerobic
 rate (lb/acre)  applications   (lb/acre/yr)  (ml/g)   metabolism (days)
```

```
-------------------------------------------------------------------------
     0.082          24.0             1.968      2.51E+02       78.0
-------------------------------------------------------------------------
groundwater screening cond (ppb) =   7.28E-01
*************************************************************************

SciGrow version 2.3
chemical:acetamiprid
time is 10/14/2011  15:46:53
-------------------------------------------------------------------------
 Application       Number of        Total Use    Koc       Soil Aerobic
 rate (lb/acre)  applications   (lb/acre/yr)  (ml/g)   metabolism (days)
-------------------------------------------------------------------------
     0.082           1.0             0.082      2.51E+02       78.0
-------------------------------------------------------------------------
groundwater screening cond (ppb) =   3.03E-02
*************************************************************************

SciGrow version 2.3
chemical:acetamiprid
time is 10/14/2011  15:47:32
-------------------------------------------------------------------------
 Application       Number of        Total Use    Koc       Soil Aerobic
 rate (lb/acre)  applications   (lb/acre/yr)  (ml/g)   metabolism (days)
-------------------------------------------------------------------------
     0.040           2.0             0.080      2.51E+02       78.0
-------------------------------------------------------------------------
groundwater screening cond (ppb) =   2.96E-02
*************************************************************************
```

Appendix C: Sample T-REX Input and Output

Upper Bound Kenaga Residues For RQ Calculation

Chemical Name:	Acetamiprid
Use	Soybeans
Formulation	0
Application Rate	0.04 lbs a.i./acre
Half-life	35 days
Application Interval	7 days
Maximum # Apps./Year	2
Length of Simulation	1 year

Acute and Chronic RQs are based on the Upper Bound Kenaga Residues.

The maximum single day residue estimation is used for both the acute and reproduction RQs.

RQs reported as "0.00" in the RQ tables below should be noted as <0.01 in your assessment. This is due to rounding and significant figure issues in Excel.

Endpoints			
Avian	Zebra Finch	LD50 (mg/kg-bw)	5.68
	Bobwhite quail	LC50 (mg/kg-diet)	5000.00
	Mallard duck	NOAEL(mg/kg-bw)	0.00
	Mallard duck	NOAEC (mg/kg-diet)	0.00
Mammals		LD50 (mg/kg-bw)	146.00
		LC50 (mg/kg-diet)	0.00
		NOAEL (mg/kg-bw)	0.00
		NOAEC (mg/kg-diet)	280.00

Dietary-based EECs (ppm)	Kenaga Values
Short Grass	17.96
Tall Grass	8.23
Broadleaf plants/sm insects	10.10
Fruits/pods/seeds/lg insects	1.12

Avian Results

Avian Class	Body Weight (g)	Ingestion (Fdry) (g bw/day)	Ingestion (Fwet) (g/day)	% body wgt consumed	FI (kg-diet/day)
Small	20	5	23	114	2.28E-02
Mid	100	13	65	65	6.49E-02
Large	1000	58	291	29	2.91E-01
Granivores	20	5	5	25	5.06E-03
	100	13	14	14	1.44E-02
	1000	58	65	6	6.46E-02

Avian Body Weight (g)	Adjusted LD50 (mg/kg-bw)
20	6.12
100	7.80
1000	11.01

Dose-based EECs (mg/kg-bw)	Avian Classes and Body Weights (grams)					
	small 20	mid 100	large 1000	Granivores(grams) 20	100	1000
Short Grass	20.45	11.66	5.22			
Tall Grass	9.37	5.35	2.39			
Broadleaf plants/sm insects	11.50	6.56	2.94			
Fruits/pods/seeds/lg insects	1.28	0.73	0.33	0.28	0.16	0.07

Dose-based RQs (Dose-based EEC/adjusted LD50)	Avian Acute RQs Size Class (grams)		
	20	100	1000
Short Grass	3.34	1.50	0.47
Tall Grass	1.53	0.69	0.22
Broadleaf plants/sm insects	1.88	0.84	0.27
Fruits/pods/seeds/lg insects	0.21	0.09	0.03
Seeds (granivore)	0.05	0.02	0.01

Dietary-based RQs (Dietary-based EEC/LC50 or NOAEC)	RQs	
	Acute	Chronic
Short Grass	0.00	#DIV/0!
Tall Grass	0.00	#DIV/0!
Broadleaf plants/sm insects	0.00	#DIV/0!
Fruits/pods/seeds/lg insects	0.00	#DIV/0!

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

Mammalian Results

Mammalian Class	Body Weight	Ingestion (Fdry) (g bwt/day)	Ingestion (Fwet) (g/day)	% body wgt consumed	FI (kg-diet/day)
Herbivores/ Insectivores	15	3	14	95	1.43E-02
	35	5	23	66	2.31E-02
	1000	31	153	15	1.53E-01
Grainvores	15	3	3	21	3.18E-03
	35	5	5	15	5.13E-03
	1000	31	34	3	3.40E-02

Mammalian Class	Body Weight	Adjusted LD50	Adjusted NOAEL
Herbivores/ Insectivores	15	320.88	0.00
	35	259.63	0.00
	1000	112.30	0.00
Grainvores	15	320.88	0.00
	35	259.63	0.00
	1000	112.30	0.00

Dose-Based EECs (mg/kg-bw)	Mammalian Classes and Body weight					
	Herbivores/ Insectivores (grams)			Granivores(grams)		
	15	35	1000	15	35	1000
Short Grass	17.12	11.83	2.74			
Tall Grass	7.85	5.42	1.26			
Broadleaf plants/sm Insects	9.63	6.66	1.54			
Fruits/pods/seeds/lg Insects	1.07	0.74	0.17	0.24	0.16	0.04

Dose-based RQs (Dose-based EEC/LD50 or NOAEL)	Small mammal 15 grams		Medium mammal 35 grams		Large mammal 1000 grams	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Short Grass	0.05	#DIV/0!	0.05	#DIV/0!	0.02	#DIV/0!
Tall Grass	0.02	#DIV/0!	0.02	#DIV/0!	0.01	#DIV/0!
Broadleaf plants/sm Insects	0.03	#DIV/0!	0.03	#DIV/0!	0.01	#DIV/0!
Fruits/pods/lg insects	0.00	#DIV/0!	0.00	#DIV/0!	0.00	#DIV/0!
Seeds (granivore)	0.00	#DIV/0!	0.00	#DIV/0!	0.00	#DIV/0!

Dietary-based RQs (Dietary-based EEC/LC50 or NOAEC)	Mammal RQs	
	Acute	Chronic
Short Grass	#DIV/0!	0.06
Tall Grass	#DIV/0!	0.03
Broadleaf plants/sm Insects	#DIV/0!	0.04
Fruits/pods/seeds/lg Insects	#DIV/0!	0.00

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

Appendix D: Sample TERRPLANT Input and Output

TerrPlant v. 1.2.2
Green values signify user inputs (Tables 1, 2 and 4).
Input and output guidance is in popups indicated by red arrows.

Table 1. Chemical Identity.	
Parameter	**User Inputs**
Chemical Name	**Acetamiprid**
PC code	**99050**
Use	**Soybeans**
Application Method	**Aerial**
Application Form	**Liquid**
Solubility in Water (ppm)	**4250**

Table 2. Input parameters used to derive EECs.			
Input Parameter	**Symbol**	**Value (user inputs)**	**Units**
Application Rate	A	**0.04**	
Incorporation	I	**1**	none
Runoff Fraction	R	**0.05**	none
Drift Fraction	D	**0.05**	none

Table 3. EECs for Acetamiprid. Units in .		
Description	**Equation**	**EEC**
Runoff to dry areas	(A/I)*R	0.002
Runoff to semi-aquatic areas	(A/I)*R*10	0.02
Spray drift	**A*D**	**0.002**
Total for dry areas	**((A/I)*R)+(A*D)**	**0.004**
Total for semi-aquatic areas	**((A/I)*R*10)+(A*D)**	**0.022**

Table 4. Plant survival and growth data used for RQ derivation. Units are in . All values are user inputs				
	Seedling Emergence		**Vegetative Vigor**	
Plant type	**EC_{25}**	**NOAEC**	**EC_{25}**	**NOAEC**
Monocot	**0.23**	**0.077**	**0.46**	**0.31**
Dicot	**0.16**	**0.077**	**0.0056**	**0.0025**

Table 5. RQ values for plants in dry and semi-aquatic areas exposed to Acetamiprid through runoff and/or spray drift.*				
Plant Type	**Listed Status**	**Dry**	**Semi-Aquatic**	**Spray Drift**
Monocot	non-listed	<0.1	<0.1	<0.1
Monocot	listed	<0.1	0.29	<0.1
Dicot	non-listed	<0.1	0.14	0.36
Dicot	listed	<0.1	0.29	0.80
*If RQ > 1.0, the LOC is exceeded, resulting in potential for risk to that plant group.				

Appendix E. Results from Screening Imbibition Program (SIP) and the Screening Tool for Inhalation Risk Assessment (STIR)

The Screening Imbibition Program (SIP v.1.0, Released June 15, 2010) was used to calculate an upper bound estimate of exposure using acetamiprid's solubility (4250 mg/L, MRID 44651803), the most sensitive acute and chronic avian toxicity endpoints (Zebra finch with LD_{50} of 5.68 mg ai/kg-bw and Mallard duck NOAEC of less than 60.2 mg/kg-diet) and the most sensitive acute and chronic mammalian toxicity endpoints (Rat LD_{50} of 146 mg ai/kg-bw and NOAEC of 7.1 mg ai/kg-bw/day or 160 mg ai/kg-diet). Based on the output, exposure through drinking water alone is potential acute and chronic risk to small birds and a potential chronic risk to small mammals. Results from SIP are shown below.

Inhalation is another potential exposure route for terrestrial vertebrates. Based on the vapor pressure of acetamiprid (7.5×10^{-10} Torr at 25°C), acetamiprid is nonvolatile from dry nonadsorbing surfaces and non-volatile from water and moist surfaces, and therefore risk from inhalation is not expected (AERU, 2009). The 4-hr LC_{50} inhalation study using rats was greater than 1.15 mg/L (MRID 44651837). The STIR model (Screening Tool for Inhalation Risk) was used to evaluate inhalation risk to birds and mammals. The endpoints discussed above were used in the model. Results from STIR are shown below.

Results from SIP version 1.0

Table 1. Inputs

Parameter	Value
Chemical name	acetamiprid
Solubility (in water at 25°C; mg/L)	4250
Mammalian LD_{50} (mg/kg-bw)	146
Mammalian test species	laboratory rat
Body weight (g) of "other" mammalian species	
Mammalian NOAEL (mg/kg-bw)	160
Mammalian test species	laboratory rat
Body weight (g) of "other" mammalian species	
Avian LD_{50} (mg/kg-bw)	5.68
Avian test species	other
Body weight (g) of "other" avian species	12.1
Mineau scaling factor	1.15
Mallard NOAEC (mg/kg-diet)	60.2
Bobwhite quail NOAEC (mg/kg-diet)	
NOAEC (mg/kg-diet) for other bird species	
Body weight (g) of other avian species	
NOAEC (mg/kg-diet) for 2nd other bird species	
Body weight (g) of 2nd other avian species	

Enter body weight of 'other' avian species for LD50.

Table 2. Mammalian Results

Parameter	Acute	Chronic
Upper bound exposure (mg/kg-bw)	731.0000	731.0000
Adjusted toxicity value (mg/kg-bw)	112.2974	123.0657
Ratio of exposure to toxicity	6.5095	5.9399
Conclusion*	**Exposure through drinking water alone is a potential concern for mammals**	**Exposure through drinking water alone is a potential concern for mammals**

Table 3. Avian Results

Parameter	Acute	Chronic
Upper bound exposure (mg/kg-bw)	3442.5000	3442.5000
Adjusted toxicity value (mg/kg-bw)	6.1247	2.9867
Ratio of exposure to acute toxicity	562.0681	1152.6191
Conclusion*	**Exposure through drinking water alone is a potential concern for birds**	**Exposure through drinking water alone is a potential concern for birds**

*Conclusion is for drinking water exposure alone. This does not combine all routes of exposure. Therefore, when aggregated with other routes (*i.e.*, diet, inhalation, dermal), pesticide exposure through drinking water may contribute to a total exposure that has potential for effects to non-target animals.

Results from STIR Version 1.0.xlsx

Welcome to the EFED Screening Tool for Inhalation Risk

This tool is designed to provide the risk assessor with a rapid method for determining the potential significance of the inhalation exposure route to birds and mammals in a risk assessment.

Input

NOTE: When entering values, press the "Ent in order to update linked cells.

Application and Chemical Information	
Enter Chemical Name	Acetamiprid
Enter Chemical Use	Soybean
Is the Application a Spray? (enter y or n)	y
If Spray What Type (enter ground or air)	air
Enter Chemical Molecular Weight (g/mole)	222.68
Enter Chemical Vapor Pressure (mmHg)	7.50E-10
Enter Application Rate (lb a.i./acre)	0.25
Toxicity Properties	
Bird	
Enter Lowest Bird Oral LD_{50} (mg/kg bw)	5.68
Enter Mineau Scaling Factor	1.15
Enter Tested Bird Weight (kg)	0.012
Mammal	
Enter Lowest Rat Oral LD_{50} (mg/kg bw)	146
Enter Lowest Rat Inhalation LC_{50} (mg/L)	1.15
Duration of Rat Inhalation Study (hrs)	4
Enter Rat Weight (kg)	0.35

Output

Results Avian (0.020 kg)		
Maximum Vapor Concentration in Air at Saturation (mg/m^3)	8.99E-06	
Maximum 1-hour Vapor Inhalation Dose (mg/kg)	1.13E-06	
Adjusted Inhalation LD_{50}	3.74E-01	
Ratio of Vapor Dose to Adjusted Inhalation LD_{50}	3.02E-06	Exposure not Likely Significant
Maximum Post-treatment Spray Inhalation Dose (mg/kg)	2.40E-02	
Ratio of Droplet Inhalation Dose to Adjusted Inhalation LD_{50}	6.42E-02	Exposure not Likely Significant

Results Mammalian (0.015 kg)		
Maximum Vapor Concentration in Air at Saturation (mg/m^3)	8.99E-06	
Maximum 1-hour Vapor Inhalation Dose (mg/kg)	1.42E-06	
Adjusted Inhalation LD_{50}	6.85E+01	
Ratio of Vapor Dose to Adjusted Inhalation LD_{50}	2.07E-08	Exposure not Likely Significant
Maximum Post-treatment Spray Inhalation Dose (mg/kg)	3.02E-02	
Ratio of Droplet Inhalation Dose to Adjusted Inhalation LD_{50}	4.41E-04	Exposure not Likely Significant

Appendix F. Estimation of Exposure of Terrestrial Plants to Acetamiprid Residues in Water Used as Irrigation Water

To estimate exposure to plants when ground water contaminated by acetamiprid is applied to crops, the following method was used.

Assume a field is irrigated with one inch of water containing 69.21 µg/L acetamiprid.

One acre has 6,272,640 cubic inches of water on the field. The one acre field with one inch of water has 3,630 cubic ft of water (6,272,640 x 0.00058 cubic ft/cubic inch). The field has 27,156 gallons of water (3,630 cubic ft x 7.481 gallons/cubic ft). Therefore, one inch of water on the one acre field weighs 226,625 lbs (27,156 gallons x 8.3453 lbs/gallon of water).

$$\frac{226{,}625 \text{ lb of water/acre} \times 6.43\ \mu\text{g/L}}{1{,}000{,}000{,}000} = 0.016 \text{ lbs ai/A}$$

Appendix G: LOCATES Output of listed species by state for soybean application

Species Counts by State (No species were excluded; minimum 1 acre; all medium types reported)
Generic taxa: Amphibian, Arachnid, Bird, Bivalve, Conf/cycds, Coral, Crustacean, Dicot, Ferns, Fish, Gastropod, Insect, Lichen, Mammal, Monocot, Reptile
Crops: Apples, collards, kale, mustard greens, turnip greens, eggplant, okra, peppers-bell (excluding pimientos), peppers other than bell (including chile), tomatoes in the open, citron, grapefruit, kumquats, lemons, lemons and limes, limes, oranges-all, tangelos, pears-all, corn-popcorn & sweet corn, asparagus, soybeans

Alabama

The Generic Taxon Amphibian has 10 species co-occurring with the indicated crops
The Generic Taxon Bird has 52 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 182 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 2 species co-occurring with the indicated crops
The Generic Taxon Dicot has 39 species co-occurring with the indicated crops
The Generic Taxon Ferns has 8 species co-occurring with the indicated crops
The Generic Taxon Fish has 47 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 33 species co-occurring with the indicated crops
The Generic Taxon Insect has 4 species co-occurring with the indicated crops
The Generic Taxon Mammal has 34 species co-occurring with the indicated crops
The Generic Taxon Monocot has 12 species co-occurring with the indicated crops
The Generic Taxon Reptile has 17 species co-occurring with the indicated crops

Arizona

The Generic Taxon Amphibian has 12 species co-occurring with the indicated crops
The Generic Taxon Bird has 44 species co-occurring with the indicated crops
The Generic Taxon Dicot has 25 species co-occurring with the indicated crops
The Generic Taxon Fish has 71 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 36 species co-occurring with the indicated crops
The Generic Taxon Monocot has 5 species co-occurring with the indicated crops
The Generic Taxon Reptile has 2 species co-occurring with the indicated crops

Arkansas

The Generic Taxon Bird has 44 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 68 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 5 species co-occurring with the indicated crops
The Generic Taxon Dicot has 18 species co-occurring with the indicated crops
The Generic Taxon Fish has 20 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 5 species co-occurring with the indicated crops
The Generic Taxon Mammal has 41 species co-occurring with the indicated crops
The Generic Taxon Monocot has 1 species co-occurring with the indicated crops

California

The Generic Taxon Amphibian has 97 species co-occurring with the indicated crops
The Generic Taxon Bird has 133 species co-occurring with the indicated crops
The Generic Taxon Conf/cycds has 3 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 106 species co-occurring with the indicated crops
The Generic Taxon Dicot has 298 species co-occurring with the indicated crops
The Generic Taxon Fish has 164 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 16 species co-occurring with the indicated crops
The Generic Taxon Insect has 68 species co-occurring with the indicated crops
The Generic Taxon Mammal has 173 species co-occurring with the indicated crops
The Generic Taxon Monocot has 38 species co-occurring with the indicated crops

The Generic Taxon Reptile has 53 species co-occurring with the indicated crops

Colorado

The Generic Taxon Bird has 83 species co-occurring with the indicated crops
The Generic Taxon Dicot has 20 species co-occurring with the indicated crops
The Generic Taxon Fish has 75 species co-occurring with the indicated crops
The Generic Taxon Insect has 11 species co-occurring with the indicated crops
The Generic Taxon Mammal has 65 species co-occurring with the indicated crops
The Generic Taxon Monocot has 10 species co-occurring with the indicated crops

Connecticut

The Generic Taxon Bird has 12 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 1 species co-occurring with the indicated crops
The Generic Taxon Dicot has 2 species co-occurring with the indicated crops
The Generic Taxon Insect has 2 species co-occurring with the indicated crops
The Generic Taxon Mammal has 1 species co-occurring with the indicated crops
The Generic Taxon Monocot has 2 species co-occurring with the indicated crops
The Generic Taxon Reptile has 2 species co-occurring with the indicated crops

Delaware

The Generic Taxon Bird has 1 species co-occurring with the indicated crops
The Generic Taxon Dicot has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 1 species co-occurring with the indicated crops
The Generic Taxon Monocot has 1 species co-occurring with the indicated crops
The Generic Taxon Reptile has 1 species co-occurring with the indicated crops

Florida

The Generic Taxon Amphibian has 23 species co-occurring with the indicated crops
The Generic Taxon Bird has 280 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 40 species co-occurring with the indicated crops
The Generic Taxon Conf/cycds has 2 species co-occurring with the indicated crops
The Generic Taxon Coral has 2 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 1 species co-occurring with the indicated crops
The Generic Taxon Dicot has 127 species co-occurring with the indicated crops
The Generic Taxon Fish has 50 species co-occurring with the indicated crops
The Generic Taxon Lichen has 6 species co-occurring with the indicated crops
The Generic Taxon Mammal has 98 species co-occurring with the indicated crops
The Generic Taxon Monocot has 15 species co-occurring with the indicated crops
The Generic Taxon Reptile has 104 species co-occurring with the indicated crops

Georgia

The Generic Taxon Amphibian has 24 species co-occurring with the indicated crops
The Generic Taxon Bird has 323 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 141 species co-occurring with the indicated crops
The Generic Taxon Conf/cycds has 2 species co-occurring with the indicated crops
The Generic Taxon Dicot has 76 species co-occurring with the indicated crops
The Generic Taxon Ferns has 10 species co-occurring with the indicated crops
The Generic Taxon Fish has 51 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 4 species co-occurring with the indicated crops
The Generic Taxon Lichen has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 25 species co-occurring with the indicated crops
The Generic Taxon Monocot has 31 species co-occurring with the indicated crops
The Generic Taxon Reptile has 56 species co-occurring with the indicated crops

Idaho

The Generic Taxon Dicot has 16 species co-occurring with the indicated crops
The Generic Taxon Fish has 46 species co-occurring with the indicated crops

The Generic Taxon Gastropod has 13 species co-occurring with the indicated crops
The Generic Taxon Mammal has 28 species co-occurring with the indicated crops
The Generic Taxon Monocot has 5 species co-occurring with the indicated crops

Illinois

The Generic Taxon Bird has 7 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 14 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 2 species co-occurring with the indicated crops
The Generic Taxon Dicot has 36 species co-occurring with the indicated crops
The Generic Taxon Fish has 14 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 4 species co-occurring with the indicated crops
The Generic Taxon Mammal has 31 species co-occurring with the indicated crops
The Generic Taxon Monocot has 9 species co-occurring with the indicated crops

Indiana

The Generic Taxon Bird has 1 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 22 species co-occurring with the indicated crops
The Generic Taxon Dicot has 8 species co-occurring with the indicated crops
The Generic Taxon Insect has 4 species co-occurring with the indicated crops
The Generic Taxon Mammal has 95 species co-occurring with the indicated crops
The Generic Taxon Monocot has 1 species co-occurring with the indicated crops
The Generic Taxon Reptile has 3 species co-occurring with the indicated crops

Iowa

The Generic Taxon Bird has 5 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 10 species co-occurring with the indicated crops
The Generic Taxon Dicot has 110 species co-occurring with the indicated crops
The Generic Taxon Fish has 25 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 5 species co-occurring with the indicated crops
The Generic Taxon Mammal has 38 species co-occurring with the indicated crops
The Generic Taxon Monocot has 103 species co-occurring with the indicated crops

Kansas

The Generic Taxon Bird has 71 species co-occurring with the indicated crops
The Generic Taxon Dicot has 12 species co-occurring with the indicated crops
The Generic Taxon Fish has 51 species co-occurring with the indicated crops
The Generic Taxon Insect has 4 species co-occurring with the indicated crops
The Generic Taxon Mammal has 2 species co-occurring with the indicated crops
The Generic Taxon Monocot has 4 species co-occurring with the indicated crops

Kentucky

The Generic Taxon Bird has 29 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 290 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 3 species co-occurring with the indicated crops
The Generic Taxon Dicot has 38 species co-occurring with the indicated crops
The Generic Taxon Fish has 17 species co-occurring with the indicated crops
The Generic Taxon Insect has 3 species co-occurring with the indicated crops
The Generic Taxon Mammal has 100 species co-occurring with the indicated crops

Louisiana

The Generic Taxon Bird has 38 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 8 species co-occurring with the indicated crops
The Generic Taxon Dicot has 2 species co-occurring with the indicated crops
The Generic Taxon Ferns has 2 species co-occurring with the indicated crops
The Generic Taxon Fish has 83 species co-occurring with the indicated crops
The Generic Taxon Mammal has 88 species co-occurring with the indicated crops

The Generic Taxon Reptile has 5 species co-occurring with the indicated crops

Maine

The Generic Taxon Bird has 10 species co-occurring with the indicated crops
The Generic Taxon Dicot has 1 species co-occurring with the indicated crops
The Generic Taxon Fish has 10 species co-occurring with the indicated crops
The Generic Taxon Mammal has 11 species co-occurring with the indicated crops
The Generic Taxon Monocot has 5 species co-occurring with the indicated crops

Maryland

The Generic Taxon Bird has 1 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 4 species co-occurring with the indicated crops
The Generic Taxon Dicot has 9 species co-occurring with the indicated crops
The Generic Taxon Fish has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 5 species co-occurring with the indicated crops
The Generic Taxon Mammal has 12 species co-occurring with the indicated crops
The Generic Taxon Monocot has 4 species co-occurring with the indicated crops
The Generic Taxon Reptile has 4 species co-occurring with the indicated crops

Massachusetts

The Generic Taxon Bird has 19 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 2 species co-occurring with the indicated crops
The Generic Taxon Dicot has 2 species co-occurring with the indicated crops
The Generic Taxon Fish has 5 species co-occurring with the indicated crops
The Generic Taxon Insect has 5 species co-occurring with the indicated crops
The Generic Taxon Mammal has 1 species co-occurring with the indicated crops
The Generic Taxon Monocot has 6 species co-occurring with the indicated crops
The Generic Taxon Reptile has 4 species co-occurring with the indicated crops

Michigan

The Generic Taxon Bird has 35 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 4 species co-occurring with the indicated crops
The Generic Taxon Dicot has 43 species co-occurring with the indicated crops
The Generic Taxon Ferns has 2 species co-occurring with the indicated crops
The Generic Taxon Insect has 26 species co-occurring with the indicated crops
The Generic Taxon Mammal has 67 species co-occurring with the indicated crops
The Generic Taxon Monocot has 27 species co-occurring with the indicated crops
The Generic Taxon Reptile has 6 species co-occurring with the indicated crops

Minnesota

The Generic Taxon Bird has 1 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 11 species co-occurring with the indicated crops
The Generic Taxon Dicot has 15 species co-occurring with the indicated crops
The Generic Taxon Fish has 5 species co-occurring with the indicated crops
The Generic Taxon Insect has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 38 species co-occurring with the indicated crops
The Generic Taxon Monocot has 15 species co-occurring with the indicated crops

Mississippi

The Generic Taxon Amphibian has 2 species co-occurring with the indicated crops
The Generic Taxon Bird has 30 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 35 species co-occurring with the indicated crops
The Generic Taxon Dicot has 9 species co-occurring with the indicated crops
The Generic Taxon Ferns has 11 species co-occurring with the indicated crops
The Generic Taxon Fish has 47 species co-occurring with the indicated crops
The Generic Taxon Mammal has 93 species co-occurring with the indicated crops
The Generic Taxon Reptile has 47 species co-occurring with the indicated crops

Missouri
The Generic Taxon Bird has 6 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 35 species co-occurring with the indicated crops
The Generic Taxon Dicot has 59 species co-occurring with the indicated crops
The Generic Taxon Fish has 92 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 6 species co-occurring with the indicated crops
The Generic Taxon Mammal has 107 species co-occurring with the indicated crops
The Generic Taxon Monocot has 3 species co-occurring with the indicated crops

Montana
The Generic Taxon Bird has 18 species co-occurring with the indicated crops
The Generic Taxon Dicot has 6 species co-occurring with the indicated crops
The Generic Taxon Fish has 23 species co-occurring with the indicated crops
The Generic Taxon Mammal has 41 species co-occurring with the indicated crops
The Generic Taxon Monocot has 5 species co-occurring with the indicated crops

Nebraska
The Generic Taxon Bird has 125 species co-occurring with the indicated crops
The Generic Taxon Dicot has 5 species co-occurring with the indicated crops
The Generic Taxon Fish has 32 species co-occurring with the indicated crops
The Generic Taxon Insect has 15 species co-occurring with the indicated crops
The Generic Taxon Mammal has 51 species co-occurring with the indicated crops
The Generic Taxon Monocot has 17 species co-occurring with the indicated crops

Nevada
The Generic Taxon Bird has 4 species co-occurring with the indicated crops
The Generic Taxon Dicot has 9 species co-occurring with the indicated crops
The Generic Taxon Fish has 31 species co-occurring with the indicated crops
The Generic Taxon Insect has 3 species co-occurring with the indicated crops
The Generic Taxon Mammal has 1 species co-occurring with the indicated crops
The Generic Taxon Monocot has 1 species co-occurring with the indicated crops
The Generic Taxon Reptile has 4 species co-occurring with the indicated crops

New Hampshire
The Generic Taxon Bird has 1 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 4 species co-occurring with the indicated crops
The Generic Taxon Dicot has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 1 species co-occurring with the indicated crops
The Generic Taxon Monocot has 8 species co-occurring with the indicated crops

New Jersey
The Generic Taxon Bird has 24 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 3 species co-occurring with the indicated crops
The Generic Taxon Dicot has 17 species co-occurring with the indicated crops
The Generic Taxon Insect has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 11 species co-occurring with the indicated crops
The Generic Taxon Monocot has 25 species co-occurring with the indicated crops
The Generic Taxon Reptile has 18 species co-occurring with the indicated crops

New Mexico
The Generic Taxon Amphibian has 6 species co-occurring with the indicated crops
The Generic Taxon Bird has 64 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 2 species co-occurring with the indicated crops
The Generic Taxon Dicot has 24 species co-occurring with the indicated crops
The Generic Taxon Fish has 33 species co-occurring with the indicated crops

The Generic Taxon Gastropod has 5 species co-occurring with the indicated crops
The Generic Taxon Mammal has 33 species co-occurring with the indicated crops
The Generic Taxon Reptile has 1 species co-occurring with the indicated crops

New York

The Generic Taxon Bird has 63 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 6 species co-occurring with the indicated crops
The Generic Taxon Dicot has 11 species co-occurring with the indicated crops
The Generic Taxon Ferns has 2 species co-occurring with the indicated crops
The Generic Taxon Fish has 13 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 4 species co-occurring with the indicated crops
The Generic Taxon Mammal has 28 species co-occurring with the indicated crops
The Generic Taxon Monocot has 11 species co-occurring with the indicated crops
The Generic Taxon Reptile has 22 species co-occurring with the indicated crops

North Carolina

The Generic Taxon Arachnid has 7 species co-occurring with the indicated crops
The Generic Taxon Bird has 153 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 42 species co-occurring with the indicated crops
The Generic Taxon Dicot has 124 species co-occurring with the indicated crops
The Generic Taxon Fish has 25 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 2 species co-occurring with the indicated crops
The Generic Taxon Lichen has 12 species co-occurring with the indicated crops
The Generic Taxon Mammal has 51 species co-occurring with the indicated crops
The Generic Taxon Monocot has 23 species co-occurring with the indicated crops
The Generic Taxon Reptile has 48 species co-occurring with the indicated crops

North Dakota

The Generic Taxon Bird has 61 species co-occurring with the indicated crops
The Generic Taxon Fish has 16 species co-occurring with the indicated crops
The Generic Taxon Mammal has 49 species co-occurring with the indicated crops
The Generic Taxon Monocot has 2 species co-occurring with the indicated crops

Ohio

The Generic Taxon Bird has 8 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 43 species co-occurring with the indicated crops
The Generic Taxon Dicot has 13 species co-occurring with the indicated crops
The Generic Taxon Fish has 4 species co-occurring with the indicated crops
The Generic Taxon Insect has 5 species co-occurring with the indicated crops
The Generic Taxon Mammal has 88 species co-occurring with the indicated crops
The Generic Taxon Monocot has 8 species co-occurring with the indicated crops
The Generic Taxon Reptile has 5 species co-occurring with the indicated crops

Oklahoma

The Generic Taxon Bird has 219 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 12 species co-occurring with the indicated crops
The Generic Taxon Fish has 30 species co-occurring with the indicated crops
The Generic Taxon Insect has 34 species co-occurring with the indicated crops
The Generic Taxon Mammal has 19 species co-occurring with the indicated crops
The Generic Taxon Monocot has 2 species co-occurring with the indicated crops
The Generic Taxon Reptile has 1 species co-occurring with the indicated crops

Oregon

The Generic Taxon Bird has 46 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 1 species co-occurring with the indicated crops

The Generic Taxon Dicot has 52 species co-occurring with the indicated crops
The Generic Taxon Fish has 136 species co-occurring with the indicated crops
The Generic Taxon Insect has 10 species co-occurring with the indicated crops
The Generic Taxon Mammal has 39 species co-occurring with the indicated crops
The Generic Taxon Monocot has 5 species co-occurring with the indicated crops

Pennsylvania

The Generic Taxon Bird has 1 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 18 species co-occurring with the indicated crops
The Generic Taxon Mammal has 15 species co-occurring with the indicated crops
The Generic Taxon Monocot has 25 species co-occurring with the indicated crops
The Generic Taxon Reptile has 15 species co-occurring with the indicated crops

Rhode Island

The Generic Taxon Bird has 10 species co-occurring with the indicated crops
The Generic Taxon Dicot has 1 species co-occurring with the indicated crops
The Generic Taxon Fish has 5 species co-occurring with the indicated crops
The Generic Taxon Insect has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 5 species co-occurring with the indicated crops
The Generic Taxon Monocot has 2 species co-occurring with the indicated crops

South Carolina

The Generic Taxon Amphibian has 4 species co-occurring with the indicated crops
The Generic Taxon Bird has 108 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 15 species co-occurring with the indicated crops
The Generic Taxon Dicot has 73 species co-occurring with the indicated crops
The Generic Taxon Ferns has 1 species co-occurring with the indicated crops
The Generic Taxon Fish has 25 species co-occurring with the indicated crops
The Generic Taxon Lichen has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 6 species co-occurring with the indicated crops
The Generic Taxon Monocot has 8 species co-occurring with the indicated crops
The Generic Taxon Reptile has 2 species co-occurring with the indicated crops

South Dakota

The Generic Taxon Bird has 67 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 4 species co-occurring with the indicated crops
The Generic Taxon Fish has 58 species co-occurring with the indicated crops
The Generic Taxon Insect has 5 species co-occurring with the indicated crops
The Generic Taxon Monocot has 13 species co-occurring with the indicated crops

Tennessee

The Generic Taxon Arachnid has 2 species co-occurring with the indicated crops
The Generic Taxon Bird has 24 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 346 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 2 species co-occurring with the indicated crops
The Generic Taxon Dicot has 59 species co-occurring with the indicated crops
The Generic Taxon Ferns has 4 species co-occurring with the indicated crops
The Generic Taxon Fish has 71 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 7 species co-occurring with the indicated crops
The Generic Taxon Lichen has 2 species co-occurring with the indicated crops
The Generic Taxon Mammal has 77 species co-occurring with the indicated crops
The Generic Taxon Monocot has 4 species co-occurring with the indicated crops

Texas

The Generic Taxon Amphibian has 19 species co-occurring with the indicated crops
The Generic Taxon Arachnid has 12 species co-occurring with the indicated crops
The Generic Taxon Bird has 285 species co-occurring with the indicated crops

The Generic Taxon Crustacean has 5 species co-occurring with the indicated crops
The Generic Taxon Dicot has 54 species co-occurring with the indicated crops
The Generic Taxon Fish has 21 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 18 species co-occurring with the indicated crops
The Generic Taxon Mammal has 107 species co-occurring with the indicated crops
The Generic Taxon Monocot has 19 species co-occurring with the indicated crops
The Generic Taxon Reptile has 9 species co-occurring with the indicated crops

Utah

The Generic Taxon Bird has 26 species co-occurring with the indicated crops
The Generic Taxon Dicot has 45 species co-occurring with the indicated crops
The Generic Taxon Fish has 41 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 24 species co-occurring with the indicated crops
The Generic Taxon Monocot has 11 species co-occurring with the indicated crops
The Generic Taxon Reptile has 1 species co-occurring with the indicated crops

Vermont

The Generic Taxon Bivalve has 3 species co-occurring with the indicated crops
The Generic Taxon Dicot has 1 species co-occurring with the indicated crops
The Generic Taxon Mammal has 5 species co-occurring with the indicated crops
The Generic Taxon Monocot has 3 species co-occurring with the indicated crops

Virginia

The Generic Taxon Amphibian has 3 species co-occurring with the indicated crops
The Generic Taxon Arachnid has 1 species co-occurring with the indicated crops
The Generic Taxon Bird has 7 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 99 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 8 species co-occurring with the indicated crops
The Generic Taxon Dicot has 84 species co-occurring with the indicated crops
The Generic Taxon Fish has 29 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 1 species co-occurring with the indicated crops
The Generic Taxon Insect has 12 species co-occurring with the indicated crops
The Generic Taxon Mammal has 59 species co-occurring with the indicated crops
The Generic Taxon Monocot has 45 species co-occurring with the indicated crops
The Generic Taxon Reptile has 4 species co-occurring with the indicated crops

Washington

The Generic Taxon Bird has 47 species co-occurring with the indicated crops
The Generic Taxon Dicot has 21 species co-occurring with the indicated crops
The Generic Taxon Fish has 150 species co-occurring with the indicated crops
The Generic Taxon Insect has 2 species co-occurring with the indicated crops
The Generic Taxon Mammal has 86 species co-occurring with the indicated crops
The Generic Taxon Monocot has 17 species co-occurring with the indicated crops

West Virginia

The Generic Taxon Amphibian has 5 species co-occurring with the indicated crops
The Generic Taxon Bivalve has 17 species co-occurring with the indicated crops
The Generic Taxon Crustacean has 1 species co-occurring with the indicated crops
The Generic Taxon Dicot has 17 species co-occurring with the indicated crops
The Generic Taxon Gastropod has 2 species co-occurring with the indicated crops
The Generic Taxon Mammal has 14 species co-occurring with the indicated crops
The Generic Taxon Monocot has 3 species co-occurring with the indicated crops

Wisconsin

The Generic Taxon Bird has 6 species co-occurring with the indicated crops

The Generic Taxon Bivalve has 12 species co-occurring with the indicated crops
The Generic Taxon Dicot has 22 species co-occurring with the indicated crops
The Generic Taxon Insect has 25 species co-occurring with the indicated crops
The Generic Taxon Mammal has 40 species co-occurring with the indicated crops
The Generic Taxon Monocot has 11 species co-occurring with the indicated crops

Wyoming

The Generic Taxon Bird has 18 species co-occurring with the indicated crops
The Generic Taxon Dicot has 14 species co-occurring with the indicated crops
The Generic Taxon Fish has 16 species co-occurring with the indicated crops
The Generic Taxon Mammal has 20 species co-occurring with the indicated crops
The Generic Taxon Monocot has 18 species co-occurring with the indicated crops

No species were excluded.

Dispersed species included in report.

Marine Species

Coral (Anthozoa)

Common name	Scientific name	Family	Order
Coral, Elkhorn	*Acropora palmata*	Acroporidae	Scleractinia
Coral, Staghorn	*Acropora cervicornis*	Acroporidae	Scleractinia

Fish (Actinopterygii)

Common name	Scientific name	Family	Order
Rockfish, Bocaccio	*Sebastes paucispinis*	Scorpaenidae	Perciformes
Rockfish, Canary	*Sebastes pinniger*	Scorpaenidae	Perciformes
Rockfish, Yelloweye	*Sebastes ruberrimus*	Scorpaenidae	Perciformes
Salmon, Atlantic	*Salmo salar*	Salmonidae	Salmoniformes
Salmon, Chinook	*Oncorhynchus (=Salmo) tshawytscha*	Salmonidae	Salmoniformes
Salmon, Chum	*Oncorhynchus (=Salmo) keta*	Salmonidae	Salmoniformes
Salmon, Coho	*Oncorhynchus (=Salmo) kisutch*	Salmonidae	Salmoniformes
Salmon, Sockeye	*Oncorhynchus (=Salmo) nerka*	Salmonidae	Salmoniformes
Sawfish, Smalltooth	*Pristis pectinata*	Pristidae	Pristiformes
Steelhead	*Oncorhynchus (=Salmo) mykiss*	Salmonidae	Salmoniformes
Sturgeon, Gulf	*Acipenser oxyrinchus desotoi*	Acipenseridae	Acipenseriformes
Sturgeon, North American green	*Acipenser medirostris*	Acipenseridae	Acipenseriformes
Sturgeon, Shortnose	*Acipenser brevirostrum*	Acipenseridae	Acipenseriformes
Sturgeon, White	*Acipenser transmontanus*	Acipenseridae	Acipenseriformes

Gastropod (Gastropoda)

Common name	Scientific name	Family	Order
Abalone, Black	*Haliotis cracherodii*	Haliotidae	Vetigastropoda
Abalone, White	*Haliotis sorenseni*	Haliotidae	Vetigastropoda

Mammal (Mammalia)

Common name	Scientific name	Family	Order
Bear, polar	*Ursus maritimus*	Ursidae	Carnivora
Dugong	*Dugong dugon*	Dugongidae	Sirenia
Killer whale, Southern Resident DPS	*Orcinus orca*	Cervidae	Artiodactyla
Manatee, West Indian	*Trichechus manatus*	Trichechidae	Sirenia
Otter, Northern Sea	*Enhydra lutris kenyoni*	Mustelidae	Carnivora
Otter, Southern Sea	*Enhydra lutris nereis*	Mustelidae	Carnivora
Seal, Guadalupe Fur	*Arctocephalus townsendi*	Phocidae	Carnivora
Seal, Hawaiian Monk	*Monachus schauinslandi*	Phocidae	Carnivora
Seal, spotted	*Phoca largha*	Phocidae	Carnivora
Sea-lion, Steller	*Eumetopias jubatus*	Otariidae	Carnivora
Whale, beluga	*Delphinapterus leucas*	Monodontidae	Cetacea

Mammal (Mammalia)

Common name	Scientific name	Family	Order
Whale, Blue	*Balaenoptera musculus*	Balaenopteridae	Cetacea
Whale, Bowhead	*Balaena mysticetus*	Balaenidae	Cetacea
Whale, Finback	*Balaenoptera physalus*	Balaenopteridae	Cetacea
Whale, Gray	*Eschrichtius robustus*	Eschrichtiidae	Cetacea
Whale, Humpback	*Megaptera novaeangliae*	Balaenopteridae	Cetacea
Whale, North Atlantic right	*Eubalaena glacialis (incl. australis)*	Balaenidae	Cetacea
Whale, North Pacific right	*Eubalaena japonica*	Balaenidae	Cetacea
Whale, Sei	*Balaenoptera borealis*	Balaenopteridae	Cetacea
Whale, Sperm	*Physeter catodon (=macrocephalus)*	Physeteridae	Cetacea

Reptile (Reptilia)

Common name	Scientific name	Family	Order
Sea turtle, green	*Chelonia mydas*	Cheloniidae	Testudines
Sea turtle, hawksbill	*Eretmochelys imbricata*	Cheloniidae	Testudines
Sea turtle, Kemp's ridley	*Lepidochelys kempii*	Cheloniidae	Testudines
Sea turtle, leatherback	*Dermochelys coriacea*	Dermochelyidae	Testudines
Sea turtle, loggerhead	*Caretta caretta*	Cheloniidae	Testudines
Sea turtle, olive ridley	*Lepidochelys olivacea*	Cheloniidae	Testudines
Snake, Atlantic Salt Marsh	*Nerodia clarkii taeniata*	Colubridae	Squamata

Appendix H. Summary of Previous Ecological Risk Assessments.

he Section 3 new chemical ecological risk assessment was conducted for acetamiprid use on flowers and ornamentals, leafy vegetables, cole crops, cotton, fruiting vegetables, citrus, pome fruits, grapes and seeds (USEPA, 2002, D270368). The highest proposed maximum seasonal application rate for any crop was 0.6 lbs ai/A for pome fruits. Acetamiprid was characterized as posing low risk to the environment relative to most other insecticide based on its selective toxicity, low use rates, and rapid rate of degradation. Direct acute risk to aquatic invertebrates with direct application into shallow water bodies was predicted and chronic risk to some species (due to its selectivity) of aquatic invertebrates were predicted for other uses. Direct risk to listed terrestrial wildlife, terrestrial plants, and saltwater invertebrates were also predicted. Direct risk to terrestrial invertebrates was presumed based on acetamiprid being an insecticide; however, actual risk to terrestrial invertebrates was not quantified. The only residue of concern evaluated in the previous risk assessment was the parent acetamiprid.

Subsequent new use assessments were conducted for tobacco, potatoes and residential uses in 2004 (USEPA, 2004, D304025) and for cucurbits, stone fruits and tree nuts in 2005 (USEPA, 2005, D319610). The 2004 assessment indicated that acetamiprid may pose direct acute risks to endangered freshwater invertebrates and mammals and listed terrestrial plants while the 2005 assessment indicated additional chronic risks to aquatic invertebrates and mammals and both acute and chronic risks to birds. Additionally, direct risk to terrestrial plants was indicated. The maximum seasonal application rate for tree nuts (0.72 lbs ai/A) was the highest rate previously evaluated. The risk assessments also noted that acetamiprid was moderately toxic to bees and belonged to a class of chemicals that has been associated with causing behavioral effects in bees. Potential for indirect effects to fish were also identified. The only residue of concern evaluated in the risk assessment was parent acetamiprid.

A 2007 assessment for new uses on berries, bulb vegetables, succulent legumes and strawberries (USEPA, 2002, D270368, 2007, D335694, 365871) concluded that the proposed application rates were lower than those previously assessed resulting in lower RQs; however, the LOCs were still exceeded for the same previously identified taxa. The only residue of concern evaluated in the risk assessment was parent acetamiprid.

A 2009 assessment for new uses on red clover and the climbing vine small fruit subgroup (crop subgroup 13-07F, except fuzzy kiwifruit) indicated that the proposed uses could result in direct effects to birds, reptiles, and terrestrial-phase amphibians on both an acute and chronic exposure basis. Listed freshwater aquatic invertebrates and animals may be affected by acute exposures. Finally, listed dicotyledonous plants may be adversely affected by spray drift from aerial applications to grapes and climbing vine small fruits. Indirect effects were predicted for aquatic plants, fish, amphibians, estuarine/marine fish and aquatic invertebrates. The assessment considered the parent and the degradate, IM-1-4, as residues of concern and risk was evaluated using the total toxic residue approach.

Table H1. Previously assessed uses of acetamiprid.

Use (Citation of Assessment)	Method of Application	Maximum Single Application Rate	Maximum Seasonal Application Rate	Application Interval (days)	Maximum Number of Applications
		lbs. ai/A	lbs. ai/A		
Crop Subgroup 13-07F, Small fruit vine climbing subgroup, except fuzzy kiwifruit (USEPA, 2009, D364328)	Aerial and Ground	0.1	0.2	14	2

Use (Citation of Assessment)	Method of Application	Maximum Single Application Rate	Maximum Seasonal Application Rate	Application Interval (days)	Maximum Number of Applications
		lbs. ai/A	lbs. ai/A		
Red clover (USEPA, 2009, D364328)	Aerial and Ground	0.075	0.075	None	1
Bulb vegetables (USEPA, 2007, D335694, 365871)	Aerial and Ground	0.15	NS	7	4
Berries (USEPA, 2007, D335694, 365871)	Aerial and Ground	0.1	NS	7	5
Legumes (USEPA, 2007, D335694, 365871)	Aerial and Ground	0.1	NS	7	3
Strawberries (USEPA, 2007, D335694, 365871)	Aerial and Ground	0.13	NS	7	2
Stone Fruit (USEPA, 2005, D319610)	Aerial and Ground	0.15	0.60	10	4
Tree Nut (USEPA, 2005, D319610)	Aerial and Ground	0.18	0.72	7	4
Cucurbit[1] (USEPA, 2005, D319610)	Aerial and Ground	0.10	0.50	5	5
Potatoes and Tobacco (USEPA, 2004, D304025)	Aerial and Ground	0.075	NS	7	4
Residential Outdoor Areas (USEPA, 2004, D304025)	Aerial and Ground	2.2	NS	NS	NS
Ornamental and Flowering Plants, Outdoor and Greenhouse (USEPA, 2002, D270368)	Ground	0.15	0.55	7	NS
Cotton (USEPA, 2002, D270368)	Aerial and Ground	0.1	0.4	7	NS
Leafy Vegetables(except cucurbits), Cole Crops (USEPA, 2002, D270368)	Aerial and Ground	0.075	0.375	7	NS
Fruiting Vegetables (USEPA, 2002, D270368)	Aerial and Ground	0.075	0.3	7	NS
Citrus Fruits (USEPA, 2002, D270368)	Airblast	0.25	0.55	7	NS
Pome Fruits (USEPA, 2002, D270368)	Airblast	0.150	0.60	12	NS
Grapes (USEPA, 2002, D270368)	Aerial or Airblast	0.05	0.1	14	NS

Use (Citation of Assessment)	Method of Application	Maximum Single Application Rate	Maximum Seasonal Application Rate	Application Interval (days)	Maximum Number of Applications
		lbs. ai/A	lbs. ai/A		
Canola, mustard, seed treatment (USEPA, 2002, D270368)	Seed treatment	0.03	0.03	NA	1

NS=not specified; NA=not applicable

1 Multiple cucurbit seasons occur within one year and it is possible that cucurbits could be planted on the same plot more than once within one year.

Appendix I. Summary of PRZM/EXAMs and GENEEC EECs and Modeling Inputs for GENEEC Results

Table I1. Summary of GENEEC Inputs Used to Estimate Aquatic Exposure to Acetamiprid, IM-1-4, and Unextracted Residues[1]

Fate Property	Value	MRID (or source)	Comment
Application Parameters	See Results Table		
Kd (L/kg)	0		K_{OC} will be used in modeling
K_{OC} (L/kg-OC)	227	MRID 44651884	Mean of five K_{OC} values. See text.
Aerobic Soil Metabolism Half-life	Parent Only: 3.1 Parent+IM-1-4: 159 Parent+IM-1-4+Unextracted Residues: 383	MRID 46255603, 44651881, 44699101, 44651879	The 90th percentile upper confidence bound on the mean of eight values.
Wetted In?	No	Labels	
Method of Application	A = Aerial B = Ground D = Bait	Label	
Droplet Size Distribution	Aerial: Fine to Medium Ground: Fine	EFED Default value	
Width of No Spray Zone (feet)	Aerial Soybean: 150 Ground Soybean: 25 All other uses =0	Labels	
Solubility in Water	4250 mg/L	MRID 44651811	Value for acetamiprid
Aerobic Aquatic Metabolism (water column)	Parent Only: 75 Parent+IM-1-4: 645 Parent+IM-1-4+Unextracted Residues: 1974	MRID 44988513	Measured value times three to account for uncertainty associated with using a single value.
Photolysis in Water	34	MRID 44988509	
Hydrolysis	0 (Stable)	MRID 44651876	
Boom Height	B. High Boom Ground Sprayer		EFED Default Value
Type of Application	Broadcast		EFED Default Value

1 – Inputs determined in accordance with EFED "*Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version 2.1*" (USEPA, 2009c).

Table I2. Aquatic Estimated Environmental Concentrations (EECs) for Acetamiprid, IM-1-4, and Unextracted Residues (µg/L) (Estimated Using PRZM/EXAMs and GENEEC).

Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate		#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L)					
								PRZM/EXAMS			GENEEC		
			lbs. ai/A	kg ai/ha				peak	21-day	60-day	peak	21-day	60-day
Cotton	CAcotton_wirrigSTD.txt	01-05	0.10	0.11	4	7	Air	9.55	9.49	9.36	17.83	17.63	17.24
	MScottonSTD.txt	01-05					Air	41.03	40.70	40.30			
	NCcottonSTD.txt	01-05					Air	52.88	52.63	52.27			
		01-05					Ground	47.90	47.71	47.48	17.04	16.84	16.46
Leafy Vegetables	FLcabbageSTD.txt	01-02	0.075	0.084	5	7	Air	39.18	38.73	38.14	16.63	16.44	16.08
	CAlettuceSTD.txt	01-02					Air	47.62	47.37	46.98			
							Ground	42.55	42.26	41.79	15.88	15.69	15.34
Leafy Cole Crops	FLcabbageSTD.txt	01-02	0.1	0.11, 0.11, 0.11, 0.09	4	7	Air	38.77	38.56	38.24	17.83	17.63	17.24
	CAlettuceSTD.txt	01-02					Air	50.48	50.23	49.73			
							Ground	45.73	45.50	45.11	17.04	16.84	16.46
Fruiting Vegetables (within Crop Group 8-10)	CAtomato_wirrigSTD.txt	01-03	0.075	0.084	4	7	Air	8.87	8.78	8.68	13.37	13.22	12.93
	FLtomatoSTD_v2.txt	01-03					Air	29.52	28.97	28.56			
	PAtomatoSTD.txt	01-09					Air	21.16	21.09	20.93			
	FLpepperSTD.txt	01-05					Air	29.80	29.49	29.02			
		01-09					Ground	27.01	26.72	26.29	12.78	12.63	12.35
Citrus (within Crop Group 10-10)[2]	CAcitrus_WirrigSTD.txt	01-01	0.25d	0.28	2d	7	Air	11.27	11.17	11.01	24.39	24.11	23.58
	FLcitrusSTD.txt	01-09					Air	57.75	57.13	56.57			
			0.11d	0.12	5	7	Air	61.96	61.40	60.69			
							Ground	57.31	56.80	56.20	23.29	23.02	22.50
							Airblast	60.76	60.22	59.56	24.23	23.95	23.42
Tuberous and Corm Vegetables (within Crop Sub-group 1C)[2]	Idpotato_WirrigSTD.txt	01-06	0.075	0.084	4	7	Air	11.30	11.28	11.18	13.37	13.22	12.93
	NCsweetpotatoSTD.txt	01-06					Air	26.12	25.89	25.51			
	MEpotatoSTD.txt	01-06					Air	27.86	27.73	27.62			
		01-06					Ground	21.52	21.43	21.31	12.78	12.63	12.35
Tobacco[2]	NCtobaccoSTD.txt	01-06	0.075	0.084	4	7	Air	14.66	14.55	14.41	13.37	13.22	12.93
							Ground	10.11	10.04	9.95	12.78	12.63	12.35

Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate		#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L)					
								PRZM/EXAMS			GENEEC		
			lbs. ai/A	kg ai/ha				peak	21-day	60-day	peak	21-day	60-day
Grapes and Other Climbing Small Fruits	CAgrapes_WirrigSTD.txt	01-02	0.10	0.11	2	14	Air	5.08	5.04	50.25	8.96	8.86	8.67
	NYgrapesSTD.txt	01-09					Air	16.73	16.67	16.60			
							Ground	12.91	12.88	12.84	8.57	8.47	8.28
							Airblast	15.06	15.00	14.94	8.91	8.81	8.61
Stone Fruit (within crop Group 12)	GApeachesSTD.txt	01-07	0.15	0.17	4	10	Air	14.46	14.33	14.14	26.56	26.26	25.69
	CAfruit_WirrigSTD.txt	16-01					Air	17.28	17.17	17.02			
	MIcherriesSTD.txt	01-06					Air	44.51	44.29	44.02			
							Airblast	38.39	38.25	38.15	26.39	26.09	25.51
							Ground	31.23	31.16	30.93	25.37	25.07	24.51
Cucurbits (within Crop Group 9)	NJmelonSTD.txt	01-07	0.10	0.11	5	5	Air	45.34	44.48	43.39	22.31	22.05	21.57
	MImelonSTD.txt	01-06					Air	27.87	27.73	27.53			
	MOmelonSTD.txt	10-04					Air	29.01	28.75	28.30			
	FlcucumberSTD.txt	01-09					Air	**69.21 32.12a 6.93b**	**68.49 32.24a 6.17b**	**67.35 33.24a 5.02b**			
							Ground	65.51	64.83	63.74	21.31	21.06	20.59
Tree Nuts (within Crop Group 14, including Pistachio)[2]	Caalmond_WirrigSTD.txt	16-01	0.18	0.20	4	14	Air	24.37	24.28	24.09	**31.58 30.08a 9.23b**	**31.22 29.62a 8.73b**	**30.54 28.76a 7.82b**
	ORfilbertSTD.txt	11-09					Air	47.45	47.29	46.50			
	GApecanSTD.txt	01-06					Air	47.76	47.26	46.73			
							Airblast	44.03	43.55	43.11	31.37	31.01	30.32
							Ground	38.87	38.39	38.06	30.14	29.79	29.12
Legume	MIbeansSTD.txt	01-09	0.10	0.11	3	7	Air	43.83	43.72	43.54	13.45	13.29	13.00
							Ground	38.86	38.75	38.57	12.85	12.70	12.42
Strawberries and Berries	Flstrawberry_wirrigSTD.txt	01-02	0.13	0.15	2	7	Air	28.93	28.77	28.54	11.72	11.58	11.33
		01-02					Ground	26.36	26.22	26.02	11.20	11.07	10.82
Blueberries and Other Bush Berries	ORberriesOP.txt	07-04	0.085	0.10	5	7	Air	5.76	5.71	5.63	18.84	18.63	18.22
	NYGrapesSTD.txt	01-09					Air	36.75	36.64	36.57			
							Airblast	32.84	32.72	32.63	18.72	18.51	18.10
							Ground	27.92	27.83	27.73	18.00	17.79	17.39
Onions and Other Bulb	CAonion_WirrigSTD.txt	16-01	0.15	0.17	4	7	Air	15.87	15.74	15.60	26.75	26.44	25.87

Use Site/ Source	Scenario	App. Date (Day-Month)	Single App. Rate		#of App.	Interval Between Apps. (days)	App. Method	Estimated Surface Water Concentrations (µg/L)					
								PRZM/EXAMS			GENEEC		
			lbs. ai/A	kg ai/ha				peak	21-day	60-day	peak	21-day	60-day
Vegetables	GAonion_WirrigSTD.txt	15-09					Air	31.82	31.59	31.25			
							Ground	25.75	25.53	25.25	26.75	26.44	25.87
Clover	ORmintSTD.txt	16-04	0.075	0.084	1	NA	Air	2.34	2.33	2.31	3.40	3.36	3.29
							Ground	0.73	0.73	0.72	3.25	3.21	3.14
Asparagus	MIasparagusSTDv2.txt	01-09	0.10	0.11	2	10	Air	9.34	9.30	9.24	8.99	8.89	8.70
							Ground	5.19	5.16	5.12	8.60	8.50	8.31
Sweet Corn	MScornSTD.txt	10-04	0.10	0.11	2f	14f	Air	30.46	30.31	30.06	8.60	8.50	8.31
							Ground	28.57	28.44	28.21	8.57	8.47	8.28
			0.054	0.061	4f	7f	Air	29.40	29.18	28.89	9.63	9.52	9.31
							Ground	27.26	27.05	26.77	9.20	9.09	8.89
Pome Fruit (within Crop Group 11-10)	CAfruit_WirrigSTD.txt	16-01	0.15	0.17	4	12	Air	17.49	17.40	17.24	26.44	26.14	25.57
	NCappleSTD.txt	01-06					Air	38.98	38.76	38.43			
	PAappleSTD_V2.txt	01-07					Air	42.16	41.97	41.78			
	OrappleSTD.txt	01-10					Air	49.07	48.94	48.22			
							Airblast	38.80	38.59	38.38	26.27	25.96	25.39
							Ground	38.97	33.80	33.62	25.24	24.94	24.39
Soybean	MSsoybeanSTD.txt	16-04	0.04	0.045, 0.042	2	7	Aerial	6.67	6.60	6.53	3.19	3.15	3.08
							Ground	5.99	5.93	5.87	3.27	3.23	3.16
Bait	PAturfSTD.txt	01-06	0.082	0.092	24e	3e	Ground	51.56	51.33	50.93	74.12	73.21	71.53
Bait					1e	NA	Ground	2.06	2.05	2.05	3.28	3.24	3.17
Granular Application	PAturfSTD.txt	01-06	0.030	0.034	1	NA	Ground	0.76	0.76	0.76	0.80	0.79	0.77
			0.040	0.045	1	NA	Ground	1.01	1.00	1.00	1.60	1.58	1.55
			0.050	0.056	1	NA	Ground	1.25	1.25	1.24	Not Determined		
Aerial Application, Flowable	FlcucumberSTD.txt	01-09	0.010	0.011	2	7	Aerial	2.85	2.82	2.79	0.90	0.89	0.87
			0.020	0.022	2	7	Aerial	Not Determined			1.80	1.78	1.74
			0.0025	0.0028	2	7	Aerial	0.73	0.72	0.71	Not Determined		
			0.005	0.0056	2	7	Aerial	1.45	1.44	1.42			

Abbreviations: NA=not applicable. App.= Application

Bold values are the highest EECs for that Tier of modeling. Values without a designation represent EECs for parent, IM-1-4, and unextracted residues.

a. Represents EECs for parent and IM-1-4.

b. Represents EECs for parent alone.

c. Assumed for GENEEC.

d. Value assumed because the application rate and maximum number of applications do not combine to give the maximum seasonal application rate.

e. Assumed

f. Label allows for different combinations of number of applications and application intervals. The scenarios models add up to seasonal application rates of 0.20 lbs ai/A while 0.21 lbs ai/A are allowed on the label.